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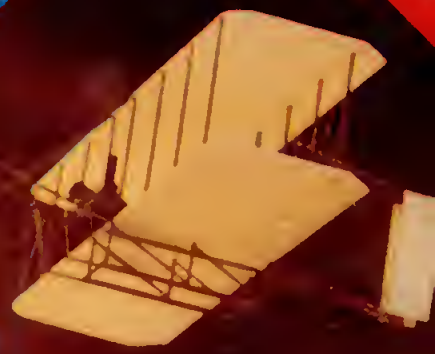
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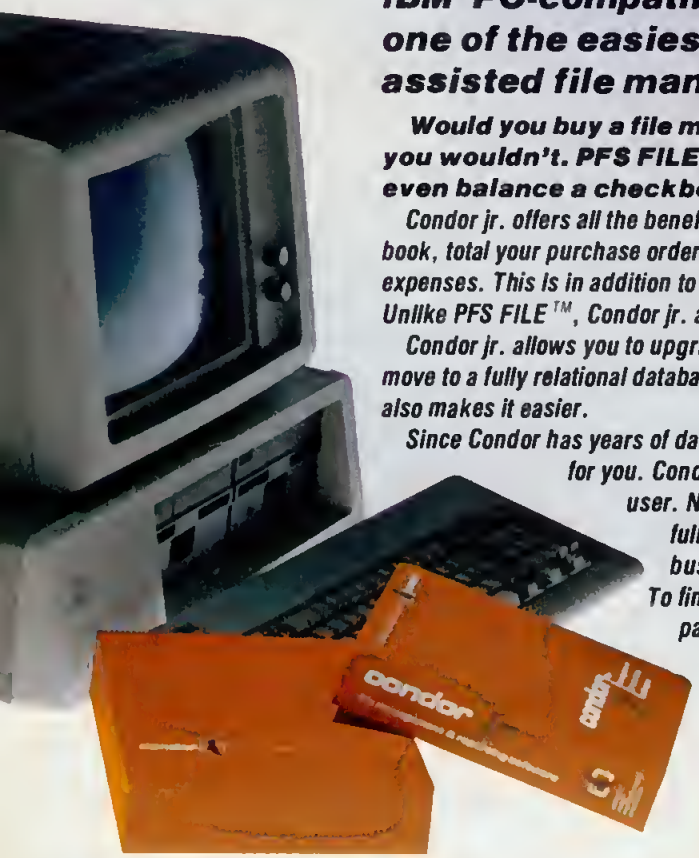
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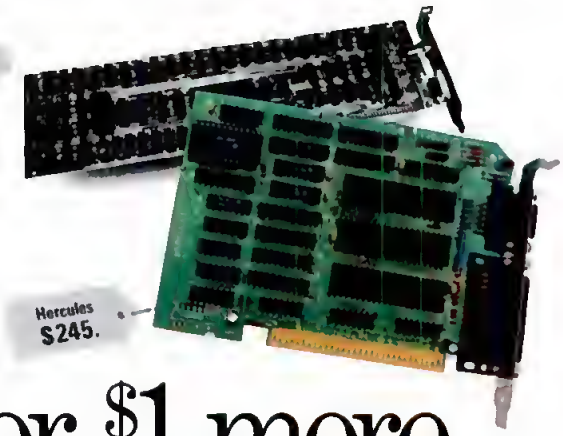
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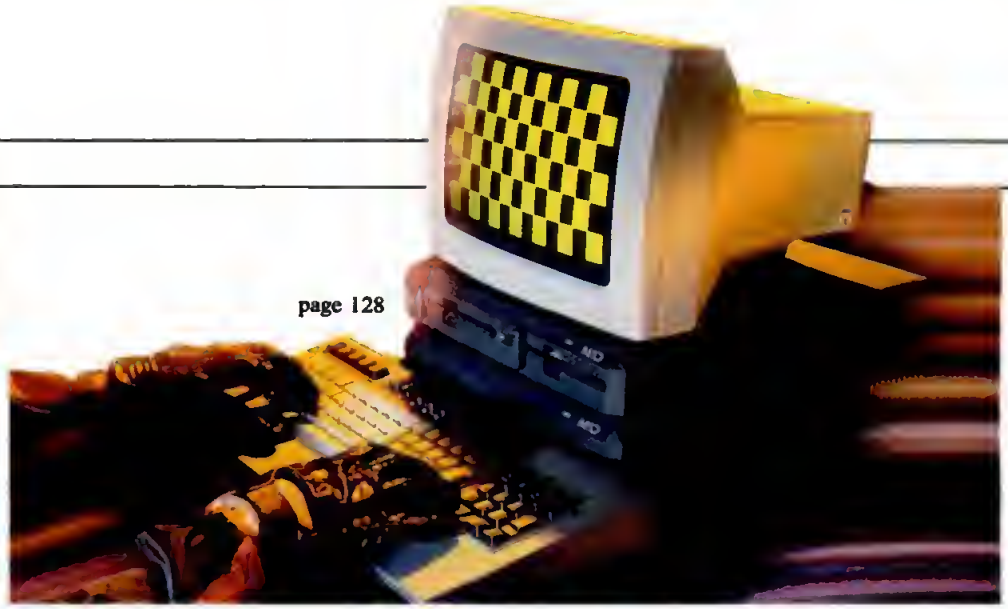
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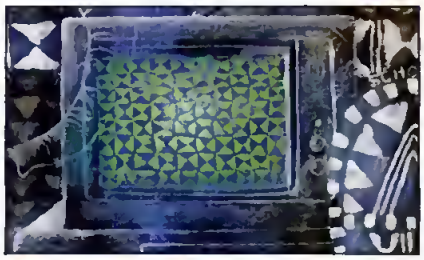
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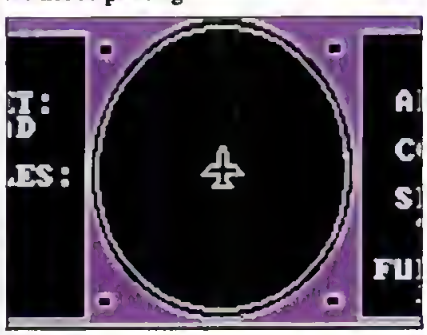
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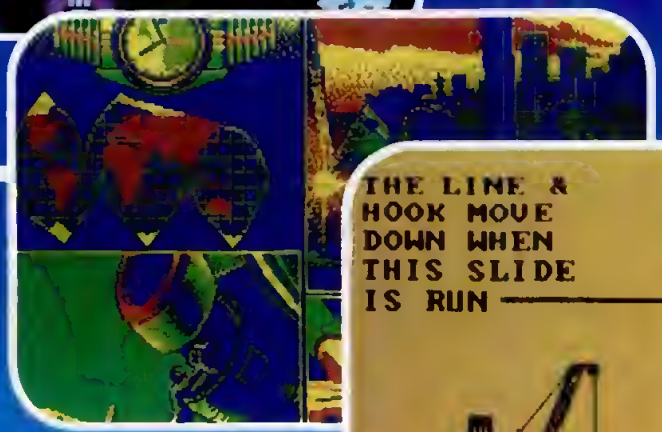
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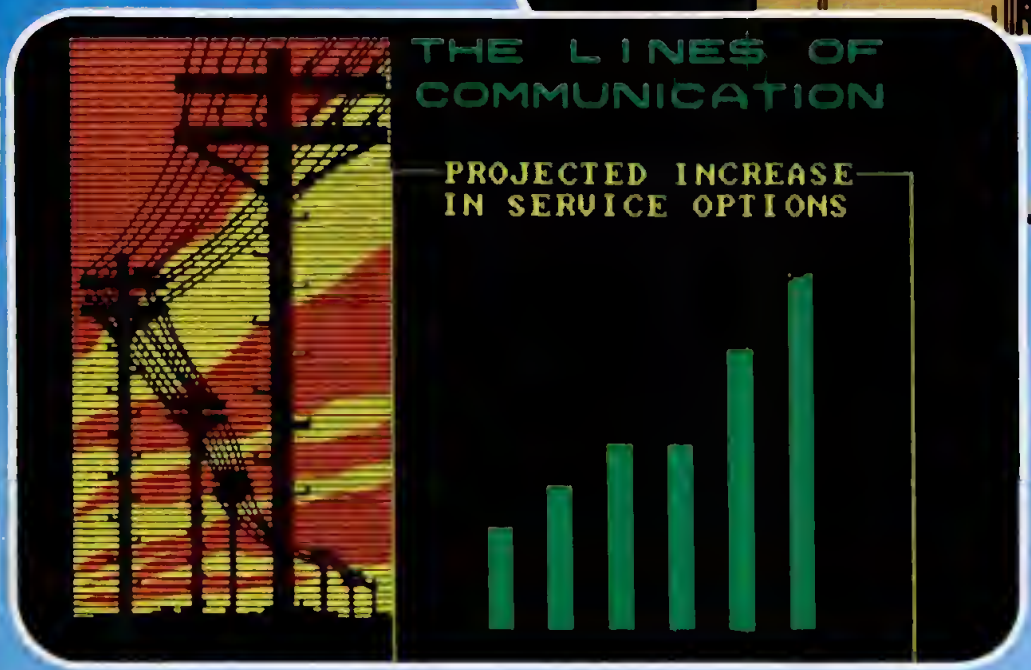


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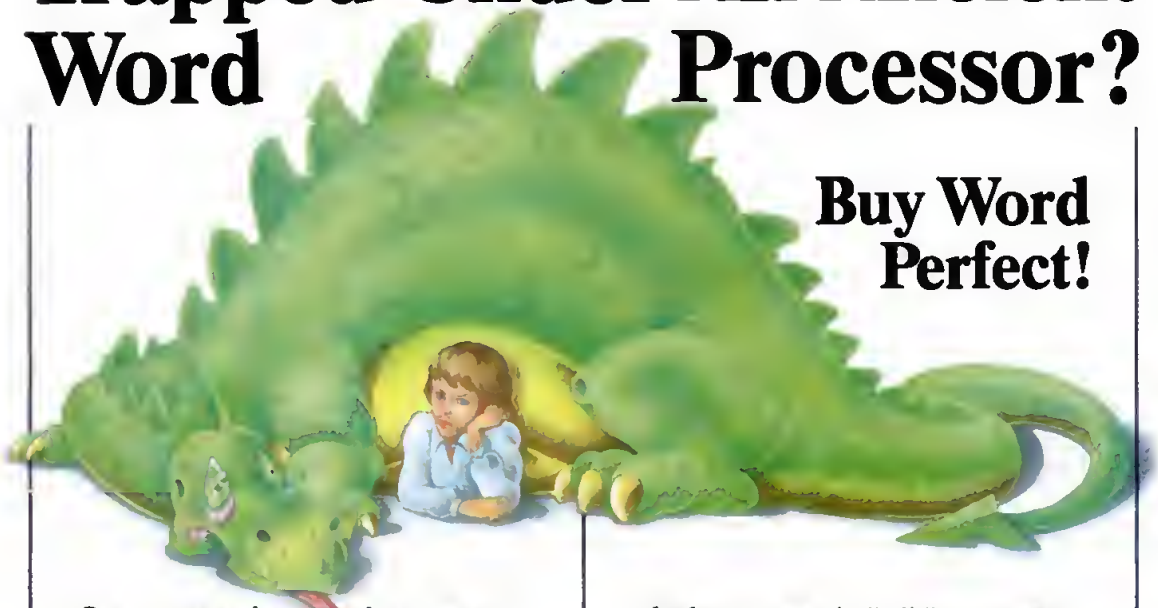
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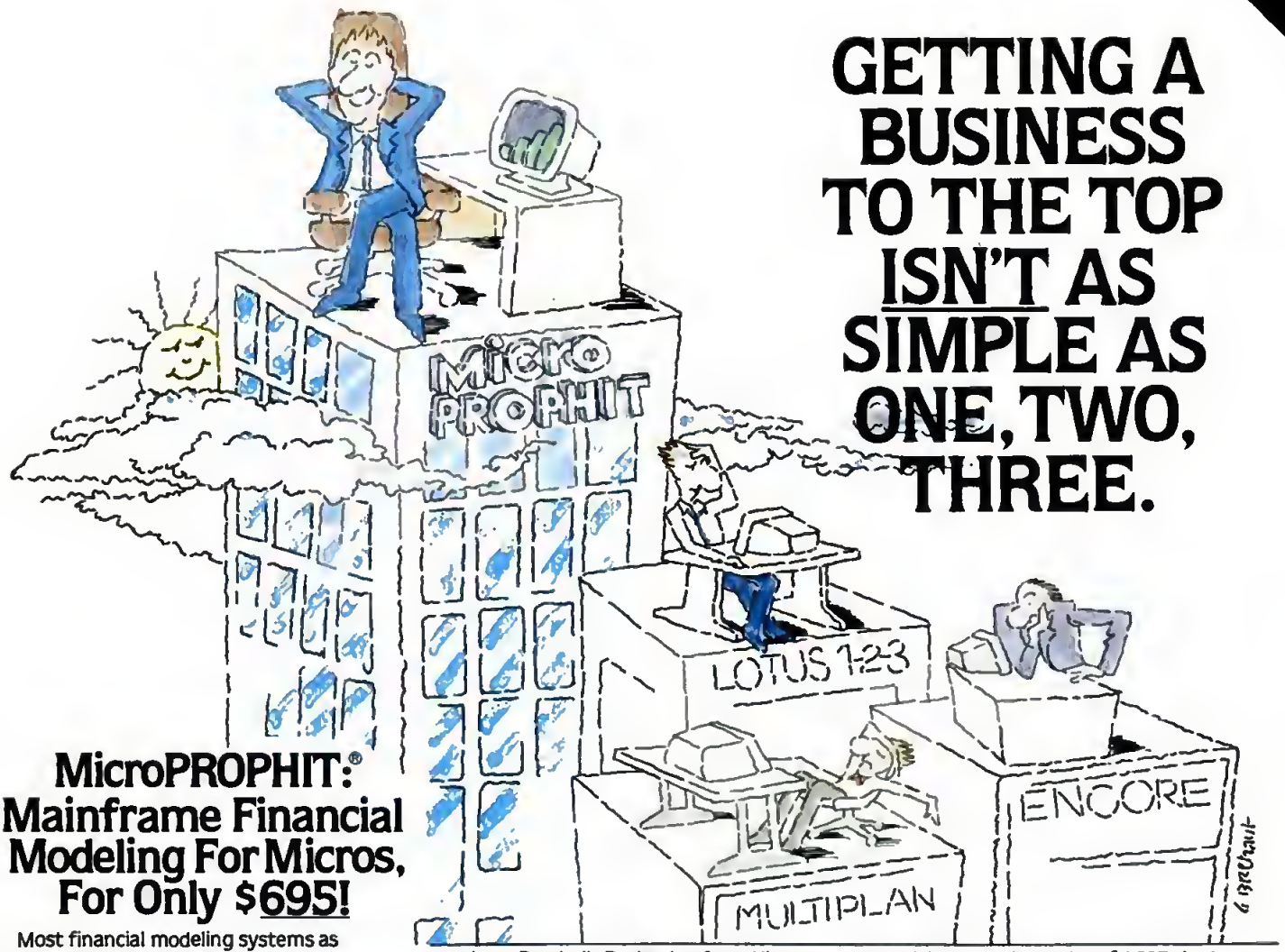
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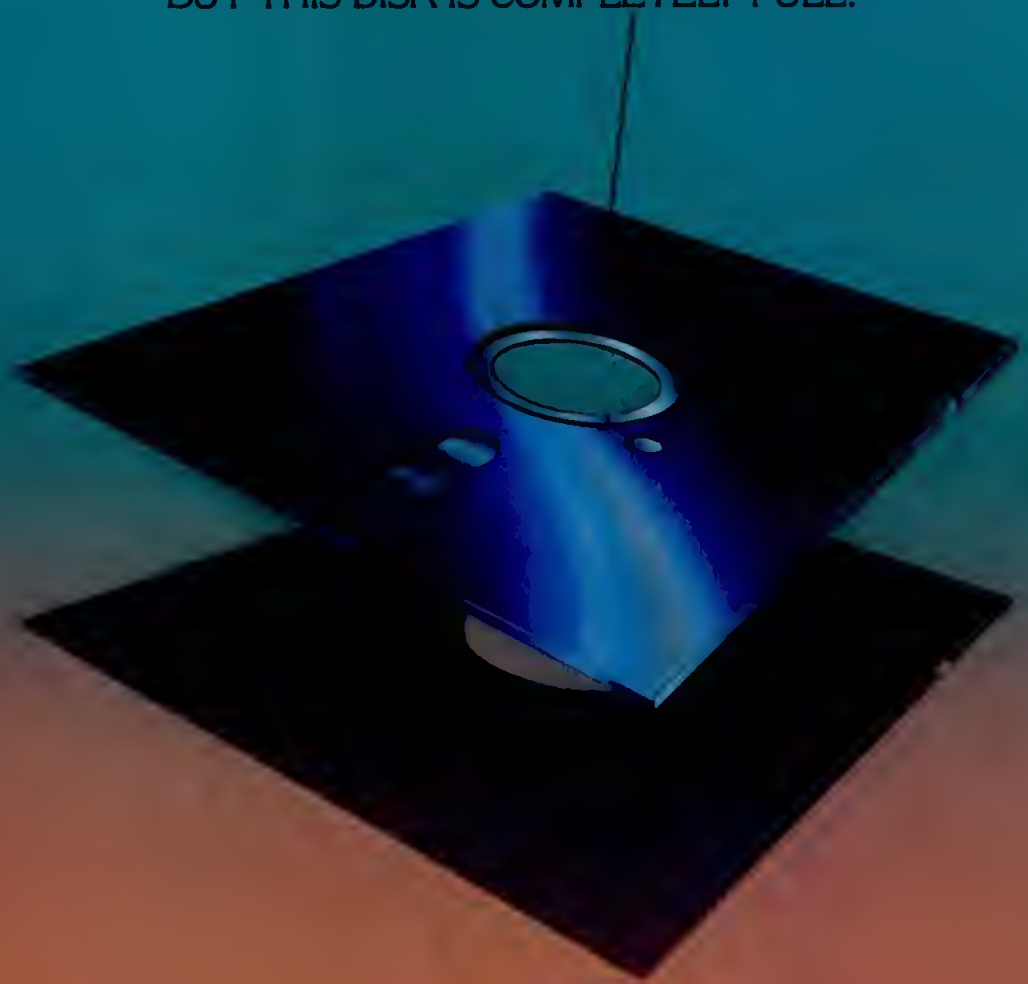
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The Independent Guide to IBM Personal Computers

What's Inside

To an editor, laryngitis means two things: first, the art of yelling at writers must be performed via electronic mail and, second, conducting an interview becomes an impossible task.

There are certain disadvantages to coming down with laryngitis when you are an editor. The typical reader of *PC Magazine* might not think so—in fact, I can hear you all murmuring in a sulky chorus, "What on earth is he (she?) talking about? Editors don't do any talking—especially editors for high-tech microcomputer magazines. All they have to do is call up the manuscripts on their terminals, use a few deft keystrokes to get the stories in shape, and then send them on to the copy editors. And if they've got any writing to do—such as What's Inside—well, how much verbalization does that require?"

Oh, ye of little knowledge!

For example, one of an editor's most important jobs (and one that is taught in every college journalism course) is to know How To Yell At Writers. This art can take several different forms. It can be done blatantly, as in the time-honored tradition of most old-movie editors ("Higgensbottom, get me that story, or I'll have your blue pencil!"). It can be done in a more low-key, California style ("Ms. Crepshot, when you were in second grade, were you absent the day they covered sentence structure?"). It can even be done as a pitiful, Little Orphan Annie plea ("Please, please, please get your column in on time, or the publisher will revoke my limousine privileges . . . ").



The neat thing about all three of these forms of yelling is that they are also useful when addressing other editors who have the dubious honor of writing a biweekly column. So that when this particular editor showed up with frozen vocal chords and no idea for What's Inside, a chorus of editorial voices was heard demanding, in a variety of the above styles, the immediate delivery of the column.

Finally, the poor editor croaked, "Don't worry. I'll just interview the writers about their various stories. It'll take an hour at most, and I'll have the column ready for you in no time at all." However, there turned out to be one catch to that otherwise brilliant idea.

When you have laryngitis, you can't interview people, either.

So the editor couldn't talk to Allen Meilach about his cover story on CAD—computer-aided design. Until recently, quality computer-generated designs could only be produced using systems that cost anywhere from $50,000 to $250,000, thus leaving small businesses and graphic artists out in the cold, clutching their colored pencils and wondering how to compete. However, with the advent of the 16-bit microcomputer, CAD has been brought into the economic range of almost anyone who can afford a PC, and a variety of new hardware and software products are available to help the new, computerized designer take full advantage of the improved technology.

Neither was the editor able to interview Scott Earle, M.D., who writes for *PC* about graphics and optic design. He has become obsessed with using various graphics software to create a program for the PC and uses it to design patterns for needlepoint. He and a needlepoint enthusiast, Catherine Vlastou, put their heads and several graphics programs together and came up with a way to transfer a design on a computer screen to a needlepoint canvas. And in the process they managed to invent a new acronym: CAN (computer-aided needlepoint).

(continued)

Photograph: Dennis Chalkin

Luckily, no interview was needed with Marty Porter, whose recent exploits were well known around the editorial office. Porter, who along with his other qualities is an enterprising gentleman, one day decided it might be nice to do a bit of gambling. So after some judicious research, he called our editorial offices and told us that Resorts International was using PCs to monitor its games and customers. Of course, to do a really good job for *PC Magazine*, he'd have to go down to Atlantic City and thoroughly investigate the system—and by the way, could we advance him about $1,000 in quarters? We decided to go along with him on the Atlantic City idea, but staunchly refused his offer to split the take.

It would have been extremely costly, if not totally impossible, to get a phone interview with John Case. Case came to us several months ago with a few queries and a rather unusual problem: how to adjust his *PC Magazine* subscription for his new home in Botswana, Africa. "Botswana?" we thought, bemused. How do you get a PC to Botswana? And what do you do with it once you've got it there? Plenty, according to Case, who proceeded to write a piece for this issue on the trials and tribulations of computerizing Africa.

It wasn't really necessary to call associate editor Barbara Krasnoff, who offers a review of *PFS:ACCESS*, a new communications software package that purports to take the work out of hooking into on-line databases, or the writers who contributed to this issue's installment of "Project: Database." Also in this issue, Winn Rosch does his usual fine job reviewing the new Envision VectorPrinter 430, and Alfred Poor looks into the latest new MS-DOS-compatible microcomputer, the MAD-1. And Microsoft, the company that gave us MS-DOS, now gives us the inside story of how to use its operating system to the fullest in an excerpt from its new book, *Running MS-DOS*.

Of course, some of our readers may have only limited sympathy for the editor, who, finding that there was no way to communicate with this issue's authors in time to write this column, had to resort to a simple rundown of the various interesting and informative articles in this magazine. They may suggest that, with such exciting material to write about, the editor should have had no problem whatsoever.

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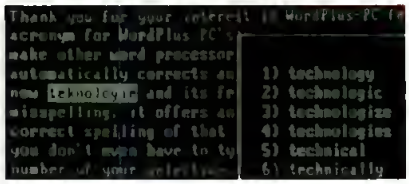
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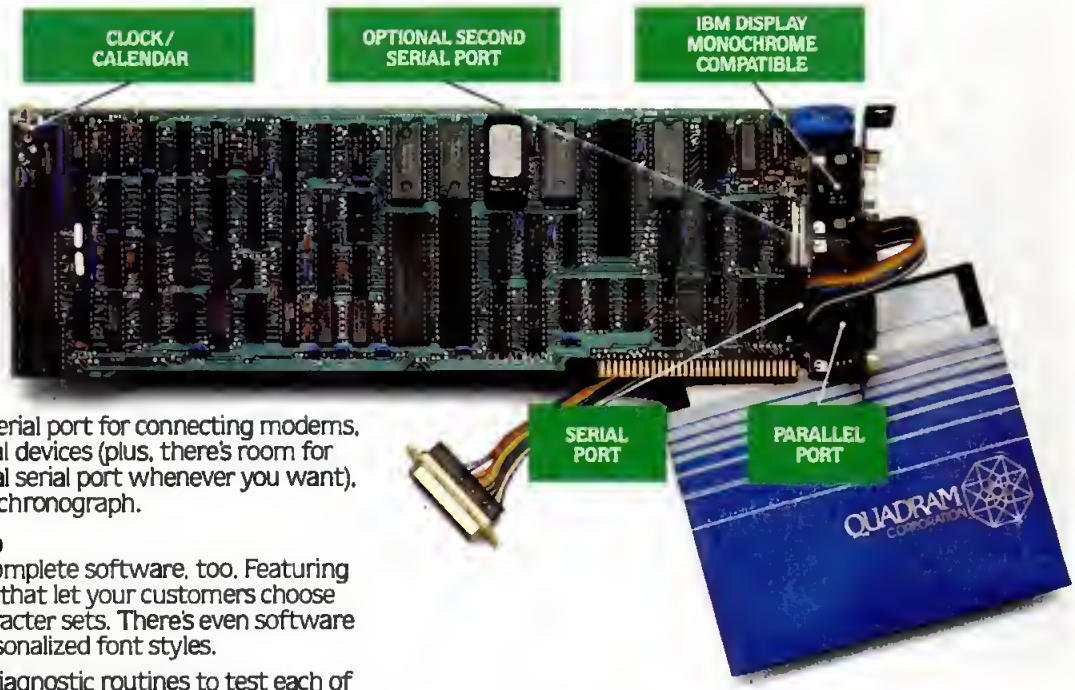
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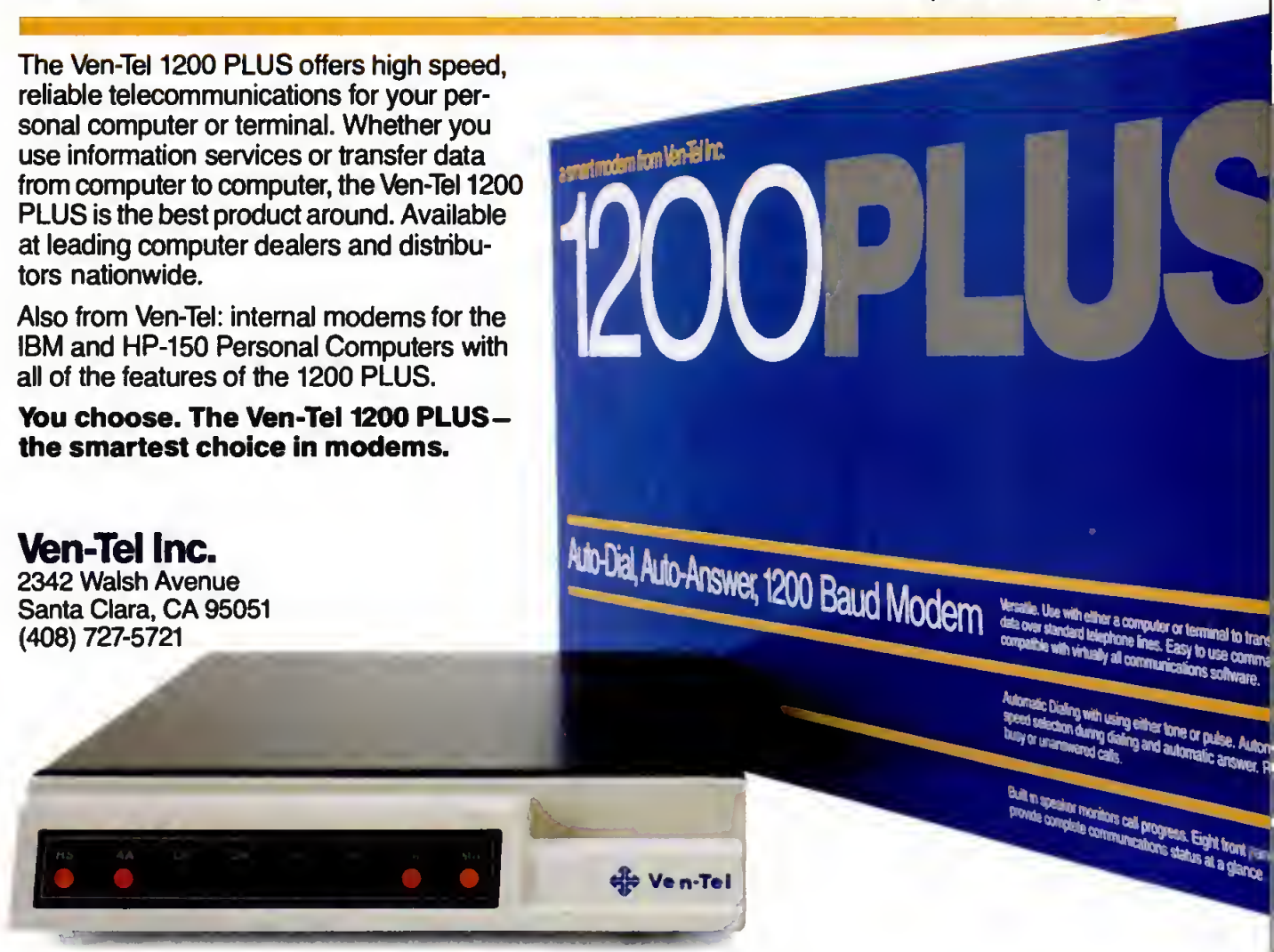
A few smart reasons to buy our smart modem:

Features	Ven-Tel 1200 PLUS	Hayes
1200 and 300 baud, auto-dial, auto-answer	Yes	Yes
Compatible with "AT" command set	Yes	Yes
Can be used with CROSSTALK-XVI or Smartcom II software	Yes	Yes
Regulated DC power pack for cool, reliable operation	Yes	**No**
Eight indicator lights to display modem status	Yes	Yes
Speaker to monitor call progress	Yes	Yes
Attractive, compact aluminum case	Yes	Yes
Two built-in phone connectors	Yes	**No**
Compatible with The Source and Dow Jones News Retrieval	Yes	Yes
Unattended remote test capability	Yes	**No**
Phone cable included	Yes	Yes
Availability	Now	
Price	**$499**	**$699**

The Ven-Tel 1200 PLUS offers high speed, reliable telecommunications for your personal computer or terminal. Whether you use information services or transfer data from computer to computer, the Ven-Tel 1200 PLUS is the best product around. Available at leading computer dealers and distributors nationwide.

Also from Ven-Tel: internal modems for the IBM and HP-150 Personal Computers with all of the features of the 1200 PLUS.

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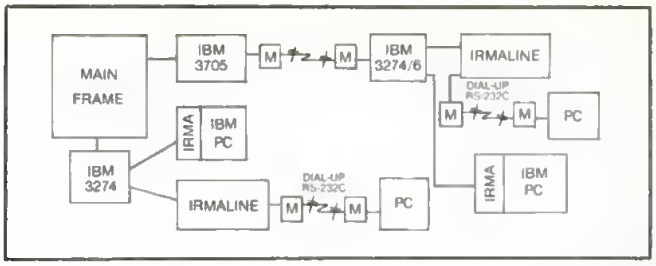
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CIRCLE 117 ON READER SERVICE CARD

IBM Personal Computer Trends and Developments

IH News

FROM THE EDITORS OF PC

JULY 24, 1984

'Gotta Have a Gimmick'

COMDEX exhibitors go to new lengths—least of which are the actual new products—to woo dealers, users at Atlanta's digital ritual

BY CONNIE WINKLER AND BILL MACHRONE

ATLANTA — Razzle-dazzle, hype and hoopla. It hit new levels at the latest COMDEX with vendors dangling more promises, glitz, gizmos, candies, and freebie trinkets in search of dealers and users.

Despite all the hoopla, there were fewer new products than at any COMDEX in recent memory. While this, to some extent, reflects the maturation of the industry, it also means the exhibitors had to work harder for the showgoers' attention. And work they did. There was a Gatlin Brothers concert, a special screening of *Indiana Jones and the Temple of Doom*, and a host of hospitality suites.

Whereas in the past exhibit viewers accepted rigged demonstrations of products in development, this season they willingly settled for video shows of the products in action...or videos of their favorite movie personalities in action around the alleged products.

Indeed, the distinctions between software packages on exhibit blurred to the point that it was difficult, if not downright impossible, to distinguish many of the products—the ones, that is, that actually existed. A surefire way to flush them out, suggested consultant Amy Wohl during one of the sessions, was to say you have an order for 6,000 users, who need the product in 3 months.

Heavies Face Off

In the integrated package center ring were Lotus' *Symphony* and *Framework* from Ashton-Tate. Coincidentally these heavyweights ended up opposite each other, almost in the center of the main tent. Ashton-Tate turned its booth at the last minute so that the two majors weren't face to face.

Symphony and *Framework*, both announced for July, are expected to be strong competitors. Both offer word processing, spreadsheet, graphics, windowing, and an assortment of extras and nifty touches for $695. The products are at the same time alike and different, and for most

(continued)

Morrow's Pivot Rivets Attention on Lap Portables

Competitors face off with LCD screens

BY CONNIE WINKLER

ATLANTA—Highly portable portables are here to stay—or go, as is more likely with the latest showings at COMDEX, especially the petite Pivot from Morrow, Inc. of San Leandro, California.

The Pivot, with one or two 5¼ drives and an 80-character by 16-line (eventually expandable to 24 lines when the technology is available) liquid crystal display (LCD), runs MS-DOS applications and fits neatly into a smallish over-the-shoulder tote. It has four icon buttons for nifty built-in functions such as a calculator. The one-drive, 128K price, $2,495.

The clever Pivot is sure to sting other lap-size manufacturers—most of whom were at



COMDEX eyeing the Morrow machine—including Hewlett-Packard, which officially presented its $2,995 HP 110 lap portable (with built-in *1-2-3*) here (see *PC*, Volume 3 Number 11, page 39).

(continued)

Gimmick *(continued)*

users and show attendees, COMDEX was the first chance to view both products.

Ashton-Tate, which has recently hired several of Lotus' top marketing people, is promising to match Lotus' trade-in offer: Lotus' existing *1-2-3* package and $200 for *Symphony*—or *Framework*. And Ashton-Tate evened up the race even further by incorporating a communications package into *Framework*. *Mite*, a well respected if not widely used communications program, will be included with *Framework* from its first ship date in July.

Crowds of Colors

More, more, more. There were more graphics applications—Leonardo da Vinci's 360-degree man was everywhere. And there were first showings of what are being classed as business presentation graphics systems.

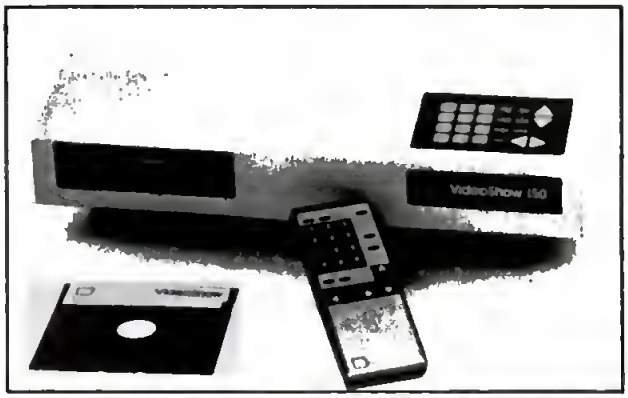
Also shown was Mouse Systems' *Paint*, a PC adaptation of the popular and fun *MacPaint* program for Apple Computer's Macintosh. The program, due in August, goes the Macintosh one better by adding color.

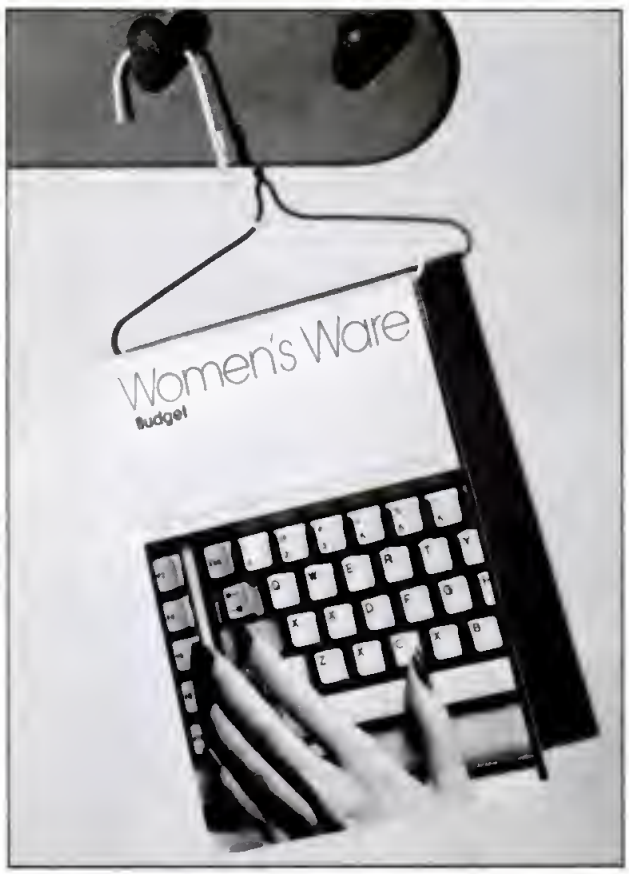
More, more, more. There were more boards and add-ons, including several to buzz up IBM's PC*jr*. And while there was the usual modicum of excitement at the IBM booth, especially over new software, there was little fawning over the *jr*. COMDEX visitors seemed to avoid the *jr* display, and one vendor with a stake in *jr*'s success suggested that vendors have become protective of the much-maligned machine, not unlike parents protecting their children.

Business Graphics

Fancy video and television terminals are already showing up as standard furniture in corporate board rooms, but now General Parametrics, a new Berkeley, Calif., company wants to put a magic box next to the monitor. The clues to the identity of the magic box are a single drive, a numeric membrane keypad, and a numeric remote control device.

The magic box is VideoShow, the $3,295 hardware portion of a big time business presentation graphics system from General Parametrics. The software is *PictureIt*, a $595 package to configure and color the graphics charts for sales or any other presentations requiring simple bar, pic, or word charts.





With *PictureIt*, the slides are designed and transferred to disk on an IBM PC or compatible. When it's showtime in the boardroom the presentation disk is played in the VideoShow, a 16-pound, Intel 8086-based, 16-bit processor with a single drive and remote control capability. General Parametrics holds that whatever else is inside the box is proprietary.

General Parametrics also is holding closely to what it calls MacroVision technology, which it says is different from the classic pixels used to create most graphics. MacroVision bypasses the classic pixel triad in favor of variable-sized groups of dots. This allows for many more variations, as many as 1,000 shades and textures, contends Herbert Baskin, president of General Parametrics Corp.

The colors immediately available in *PictureIt* coincide with a box of Crayola crayons and use the "instinctive Crayola names we all grew up with," tells one staffer. More sophisticated users can mix their own colors.

Besides any limits of the imagination, users at this point can only produce the 16 chart variations in *PictureIt*. Nor can the charts be easily fitted into other software packages—data has to be hand-transferred. And while there's a General Parametrics slide camera coming, it will only partially use digital technologies; the company also recommends Polaroid's Palette camera.

Baskin implies that these features will be coming. The hotel sneak preview of VideoShow and *PictureIt* during COMDEX was sponsored by Ben Rosen, an influential venture capitalist and big backer of Lotus' *1-2-3* and Compaq.

The company strongly believes that VideoShow will sell itself when large corporations realize how much money they can save on slide production costs. Slide costs can run as much as $80 each; as Baskin says, "VideoShow pays for itself after just one presentation."

PC Paint

If Macintosh's attractiveness could be reduced to one feature, it would be *MacPaint*. More than any other application, *MacPaint* demonstrates the utility of the mouse.

This lesson has not been lost on Mouse Systems, Inc., in Santa Clara, Calif., which previewed its *Paint* program. Of course, the package is designed to sell mice, so although *Paint* will be $125, it requires a $295 Mouse Systems mouse cursor controller.

At first peek, Mouse Systems' *Paint* appears to have all the key functions of *MacPaint*, including erase and magnify. It also uses the icons, or picture instructions, that Apple is pushing as a standard. Unlike *MacPaint*, however, Mouse Systems' *Paint* can produce curved lines and, in rubber band fashion, expand and contract them.

The program has three type fonts. The color screen's relative coarseness makes the characters somewhat less attractive than the Mac's—although still pleasant.

Women's Ware

Is there a "women's market" for software? The Neon Software Co. in Middletown, Conn., is going to find the answer, although it may be affected by the slow progress of IBM's PC*jr*.

At the first public viewing, however, vice president Ed Wennerstrand reported good responses, and indeed there were more women than men at the company's booth.

Women's Ware is seven $49.95 packages designed for any busy person who needs easy-to-learn and useful home software. The programs are particularly aimed at today's two-career women. As an enticement to purehase additional packages, each contains a $5 coupon toward the next one.

Wennerstrand also plans regional advertising campaigns using coupons to entice women into their local dealers. The seven packages are budget, calendar, checkbook, recipe, directory (addresses and special dates), filebox (to replace the family's junk drawer), and freefile (to track whatever the user wants).

Women's Ware has another curious gimmick: Its product is packaged on a hanger in the store display.

Is the hanger (which conjures up women's horror stories) or the product name itself—Women's Ware—derogatory to women? Wennerstrand says he put the question to Gloria Steinem, with whom he had worked on a stereo loudspeaker promotion in his previous career, and she had no problem with either sensitivity. ■

Morrow *(continued)*

A Hong Kong company, International Quartz, Ltd., is also pushing LCD technology in its products. Another computer sporting the 80-character by 25-line LCD sereen (the equivalent of the PC monitor) was the STM Portable PC from Semi-Tech Microelectronics of Toronto (see *PC*, Volume 3 Number 13, page 33).

These new machines demonstrate that lap-sized isn't necessarily lap-top any more.

Riveting Pivot

Limited quantities of the Pivot will be available in August through dealers who already carry Morrow's Micro Decision Systems, said Ed Niehaus of Morrow, who reported "very favorable" responses at the COMDEX initial viewing. Niehaus guessed that the 25-line LCD screen may be available on the Pivot by the second quarter, 1985. Screen resolution on the Morrow is 480 × 160 pixels.

The Pivot is based on the Harris CMOS 80C86 processor and can run up to 4 to 6 hours on the internal, rechargeable ni-cad battery, Niehaus said. (This is one of the first announced portables to use the Harris CMOS 80C86, which experts expect to become increasingly popular.) Otherwise the pivot runs on a 115-volt power supply that hangs on the wall.

The icon function keys—telecommunications, built-in modem, clock, and calculator—allow the user to pivot from the application underway, such as word processing, to the calculator and then quickly back to word processing, for example. Pivot bundles the *NewWord* word processor which Niehaus described as similar to *WordStar* with easy menus.

Because of the LCD screen, the Pivot does not have bit-mapped sereen compatibility, so it will run only those vanilla MS-DOS 2.x programs that are not dependent on IBM ROM and screen calls, Niehaus said.

The Pivot weighs 9 pounds, measures 13-by-5.6-by-9.5 inches, and has one or two Oki drives on the side. The $2,495 model will come with one drive and 128K RAM, with upgrades to 512K. There are three ports: a parallel port that mimics IBM PC I/O; an RS232C serial port with programmable baud rates from 300 to 19.2K baud, synchronous, or asynchronous; and a RJIIC port to connect the modem to telephone lines.

Pivot is the first MS-DOS machine for Morrow, headed by flamboyant George Morrow. Until now the company developed and marketed 8-bit CP/M systems, notably the aggressively priced Micro Decision systems.

Meet the Competition

International Quartz has come up with three variations on the portable theme, two of which incorporate a printer into a 35-pound unit. Two also have LCD screens.

International Quartz, a subsidiary of The Chiaphua Group, one of the Orient's largest diversified corporations, is looking for OEM contracts and other remarketing proposals, said C. H. Ng, vice president of operations for the Hong Kong company.

The three 16-bit, Intel 80186 machines—all PC compatible according to the company—integrate various technologies in interesting ways.

Most curious is the Model 9230, which has a 25-line LCD screen that swings out for adjustment and a "high-quality dot matrix printer."

The keyboard is detachable so that the three-line sereen and ROM can be used like a transportable. Further, the built-in modem allows the keyboard to communicate with the main unit via telephone.

The 9230 firmware includes the *Interquartz Memowriter*, 600-baud serial communications with the main unit, user-definable function keys, eight-digit calculator and a real-time clock and calendar. Cost on all the machines will be approximately 20 percent less than comparable U.S. versions, Ng said.

Model 9231 is similar in all respects except it has a 9-inch amber CRT sereen instead of the LCD.

Model 9240 is a 15-pound lap portable with a 25-line LCD sereen flipping up in cigar-box fashion like the Hewlett-Packard 110. It runs both MS-DOS and CP/M-86. ■



All-in-one: International Quartz's 35-pound Model 9230

Speaking of Computers: Don't Touch that PC!

"We're selling our desks, tables, cabinets, everything but our personal computers," John Glenn's campaign treasurer Bill White told *Washington Dossier*, describing the efforts underway to wipe out the Ohio Senator's $3 million campaign debt.

The New York Post*'s "Page Six" department, May 21, 1984*

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Version A: StowAway Housing & Drawer	X100A	$ 94.50
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Version C: Security Bolts & Clamp	X100C	$169.50

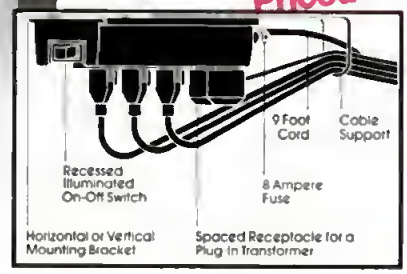
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Maxell	DS	D2002	42.90
Memorex	SS	D2301	26.90
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Finally, a true letter quality printer for less than $500!



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80 Micro magazine "studied three other daisy-wheel printers under $800 and came to the conclusion that the Juki 6100 was by far the best choice. It's smart, has plenty of features. . . the print quality is excellent." That's because the Juki uses print wheels and ribbons designed not for computer printers but typewriters — where standards for "letter quality" are set. Smart? The print wheel simply drops into place; the printer engages it automatically!

Fast? The Juki is rated at 18 characters a second. But logic-seeking bi-directional printing and high speed motion over blank spaces means typing speed for typical text equals printers with much faster ratings. *Creative Computing* says "the Juki [is] much faster than other low cost daisywheels. . . the printhead absolutely flies over white space." And there is a built-in 2,000 character buffer.

Quiet? Better than 62 dBA from 1 meter away. No raucous clatter. A big improvement over some printers we listened to. We benchmarked the Silver-Reed EXP 550, Brother HR-1, and Smith-Corona TP-1 and found them two to eight times noisier. 80 *Micro* agrees. "The Juki 6100 is one of the quietest daisy-wheel printers." Reliable? Ask an engineer about an MTBF of 2500 at 25% duty. Other printers employ intricate wires, pullies, and springs. They derail, and go out of adjustment. The Juki is elegantly simple, with few moving parts: the print head is drawn across a rail by magnetic attraction.

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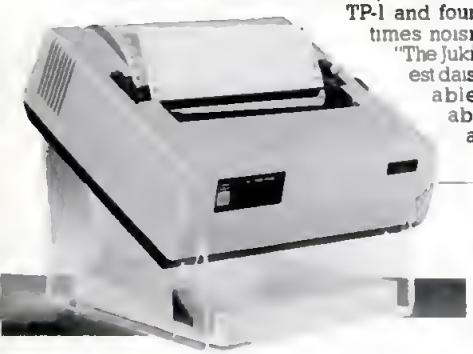
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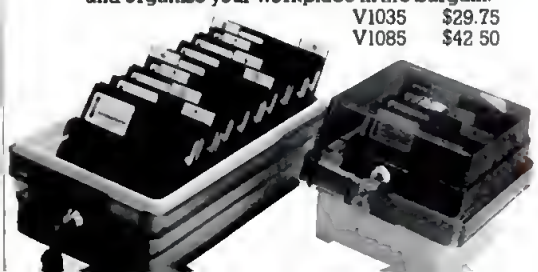
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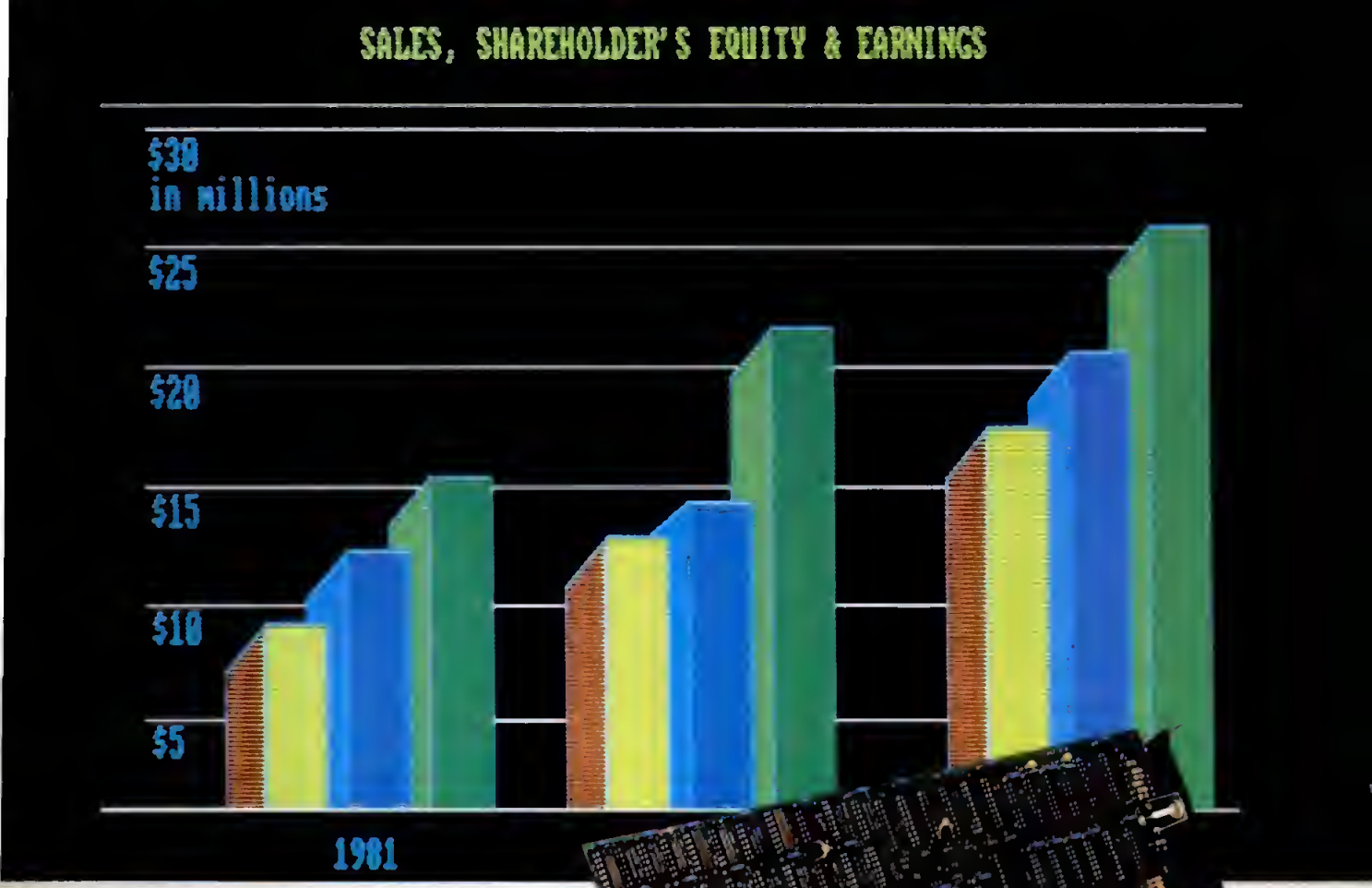
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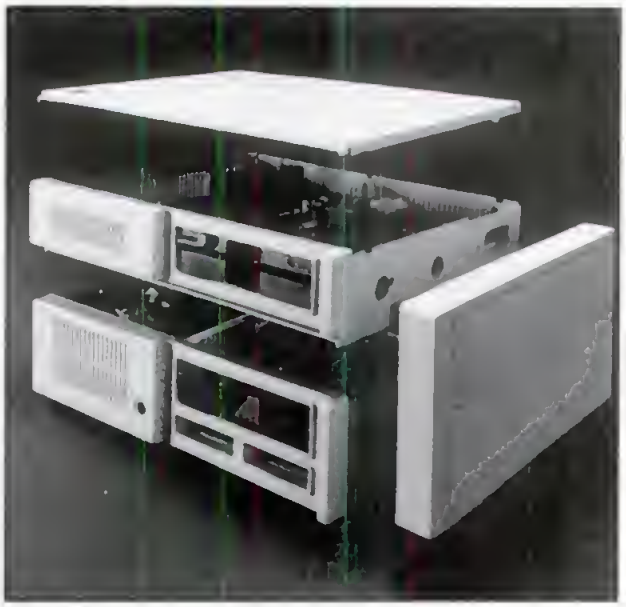
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Add-On Drives Help PCjr Grow Up



The Drive Two Enhancement Package, from Rapport Corp., expands the PCjr.

ATLANTA—If IBM's PC*jr* is in troubled waters, several manufacturers are gushing in with bridge products to raise Junior's power to the level of a PC.

Because the Junior uses off-the-shelf parts, these vendors are able to simply add parts to what IBM clumped together.

Rapport Corp., headquartered in North Salt Lake City, Utah, introduced a $675 unit that snaps on top of the Junior, which includes a second drive, 256K RAM, an additional memory slot, and separate power supply. An additional 256K is $275.

"Dealers will find it easier to sell the PC*jr* bundled with the Rapport enhancements," said Rod Crisp, Rapport's vice president of marketing. And PC*jr* users who have outgrown their systems will be relieved.

A similar scheme comes from Legacy Technologies in Lincoln, Nebraska, which has even added a hard disk to PC*jr* with its Legacy III system for $1,795. The Legacy II, a floppy configuration with expansion slots up to 640K, is $795.

Tecmar's contribution to the Junior brigade is an add-on second floppy disk drive. The initial version of this product provides little else besides the disk, but a future version, due at the end of the summer, will incorporate the additional memory, real-time clock, and expansion ports found on Tecmar's current Junior Captain board. A Tecmar hard disk unit is likely to follow the upgraded floppy unit to market in the early fall.

For more information, contact the manufacturers.

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Honeymoon Is Over Between Bruce & James and Simon & Schuster

"We were the guinea pigs. We may be only the first to get burned," says Bruce.

BY MARTIN PORTER

NEW YORK—If Bruce & James was an experiment to see if computer software could merge with traditional book publishing—let it be known that the guinea pig nearly died.

That celebrated software partnership inked a distribution deal with Simon & Schuster in 1983, to the tune of a projected $100 million in sales for their Visionline of software. Its first product was *WordVision*, a $79.95 word processor for the IBM PC.

Bruce & James Chairman Bruce McLoughlin admits to financial problems, but maintains that his software publishing company hasn't closed up shop. However, *PC Magazine* has learned that six employees were laid off, and the company has been forced to trim the service hours of its toll-free information phone number. McLoughlin says a break in relations with Simon & Schuster may be the cause of recent bankruptcy rumors.

Problems between the two parties arose recently when Simon & Schuster withheld a scheduled May 1 payment to Bruce & James. McLoughlin claims that Simon & Schuster said it expected returns on the product to exceed a 20 percent reserve pool that had been established to handle returns.

"The marriage between software and book people has turned into a giant nightmare," says McLoughlin. He claims that Simon & Schuster breached its contract by withholding the money due and he called litigation "possible," though "extremely costly."

However, Alvin Reuben, executive vice-president of Simon & Schuster's Electronic Publishing Division says that the contract may have originally been breached by Bruce & James when it delivered *WordVision* 6 months late. He adds that sales of the product have only been hurt by a lack of promotion and advertising on the part of the Dublin, Ohio-based software firm—another of Bruce & James' contractual obligations.

Troubled Rumblings

Signs of trouble at the much-publicized software firm came even before the title was commercially available, when Jim Edlin (the "James" in the partnership) left the company in what McLoughlin describes as a "parting of ways" in December 1983.

WordVision's price tag originally had been set at $49.95, but was upped $30 at retail to cover the cost of special key caps and the toll-free help number.

While there have been some rave reactions to the inexpensive word processor, a *PC Magazine* reviewer said, "Though it has more than a couple of nifty things going for it, *WordVision* is so quirky and idiosyncratic that it may be your one-way ticket to involuntary servitude." (See "Taking a Gamble with WordVision," *PC*, Volume 3 Number 6).

McLoughlin estimates that *WordVision* unit sales are in the 17,000 to 18,000 range. At the same time, Reuben says that returns so far haven't been "out of line" and describes sales reports as "fair." So where's Simon & Schuster's beef?

Reuben adds that the dispute is complicated by the fact that there were actually two contracts involved. He says that a

(continued)

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Honeymoon *(continued)*
second agreement had been reached in order to help McLoughlin secure additional funding for his financially flush corporation. Simon & Schuster's position remains that, since that financing was never secured, the second contract is invalid. This gives Simon & Schuster a different payment schedule than the one McLoughlin had been expecting. Reuben says that Simon & Schuster's current action is based on the original agreement.

"No Comment"

John Brockman, the New York literary agent responsible for the Bruce & James, Simon & Schuster contract, issued a firm "no comment" about the current state of affairs between the two companies.

Still, there's no souring on Reuben's part about the viability of software sales in book outlets. The company is scheduled to ship its first "self-published" software title—*Typing Tutor III*—in June. "Software will sell in bookstores, it just needs the promotion to pull it out to the market," Reuben says.

Then there is McLoughlin's lament: He claims that, with his contract with Simon & Schuster broken, he is hoping to secure different product distribution through more traditional software channels.

Meanwhile, Jim Edlin hasn't entirely vanished from the picture. He says that negotiations for his return to a management position with the company are currently in gear. And about the Simon & Schuster situation he will only comment, "Bruce & James has made every mistake in the book, except for one—we produced a product that is beloved by its customers."

He claims that it is because of the market reaction to the product that Bruce & James may rise again, "very much like the Chrysler Corporation."

And though McLoughlin is equally optimistic, he issues a word of warning: "We were the guinea pigs. We were the first ones out. We may be only the first to get burned." ■

Visi Ever Onward with Visi On Word

BY JAMES LANGDELL

LOS GATOS, Calif.—*Visi On Word* is finally available, bringing VisiCorp closer to completing the basic components in its Visi On environment. (See *PC*, Volume 3 Number 4, page 51.) Now that Visi On can field integrated spreadsheet, graphing, and word processing applications, VisiCorp cut the price of this complete Visi On package from $1,365 to $795 for 6 weeks. This price cut might succeed in attracting customers at a time when other integrated products, such as Lotus' *Symphony* and Ashton-Tate's *Framework*, were yet to appear. This package includes the Visi On Mouse and *Visi On Application Manager, Calc, Graph*, and *Word* software packages.

According to VisiCorp's chairman, Dan Fylstra, this discount is part of the company's strategy to penetrate the Forbes-1,000 companies. The lower price and in-house demonstrations by VisiCorp's "major account missionary teams" are aimed at encouraging large corporations to obtain evaluation copies of Visi On for comparison with other integrated business software packages they may be considering for multiple purchases.

When the promotional period ends, *Visi On Word* will be priced at $375. As to the availability of *Visi On Query*, the relational database analysis module that was announced last winter, VisiCorp has set no new date.

VisiSeries Slashes

Along with the temporary Visi On price cut, VisiCorp is making permanent price slashes in its VisiSeries software for the IBM PC. For example, *VisiCalc* Version 1.2 (which can run on PC*jr*) drops from $250 to $99—about the same price as Software Arts' *Advanced Version VisiCalc*. *VisiTrend/Plot* drops from $300 to $99, *VisiFile* from $300 to $149, and *VisiWord Plus* (which includes a spelling checker) from $375 to $195. *VisiSchedule* (now $195) and *VisiLink* (now $149) also have lower prices. The VisiSeries spreadsheet with graphing functions, *VisiCalc IV*, is still $250, however.

Another Flash

VisiCorp also released *FlashCalc*, a new spreadsheet for the Apple II family priced at $99. Unlike *VisiCalc*, which bypasses the Apple's operating system, *FlashCalc* runs within Apple's new ProDOS. VisiCorp's new program was written by Bill Graves of Nereid Systems, Inc., a software developer in Manhattan Beach, California.

FlashCalc is the first VisiCorp product that doesn't include *Visi* in its name, perhaps because of the ongoing lawsuit between VisiCorp and Software Arts (the developer of VisiCalc) over who has the right to sell *VisiCalc* and use the *Visi* trademark. Legal restraints also kept VisiCorp from commenting on differences between *FlashCalc* and *VisiCalc*, although its promotional material pointed out some advantages of *FlashCalc* over the Apple versions of *Multiplan* and *SuperCalc*^{2}.

VisiCorp has not yet announced versions of *FlashCalc* for any IBM computers. Since it requires only 64K RAM on the Apple machines, the PC*jr* should be able to run any PC-compatible version that does appear. ■

Phoning Home for Help—$380

BOCA RATON, Florida—PC users with questions about selected IBM software can now phone home for help.

Home is IBM's PC headquarters here, where IBM has started a subscription-only Software Support Center to provide prompt answers to difficult technical questions.

A $380 subscription fee buys seven single-topic phone calls "of moderate duration"—less than half an hour. Subscribers call in on a toll-free phone line, first giving the name of the program they need to discuss. IBM promises that a programming specialist will call back before long.

Support Center subscribers will also receive a disk-based monthly newsletter containing technical tips, announcements of new IBM products, and product updates. Extra newsletter subscriptions cost $30 each.

"We don't envision that the average consumer will need this type of in-depth service. For applications programs, like *PeachText* or *EasyWriter*, most people would call their dealers," says Jill Liscom of IBM. "This service is geared toward more sophisticated, technical questions. We expect it might be used by someone in an office, perhaps a programmer or a software developer."

IBM promises to continue the service, which was launched in February, until at least January 31, 1985, when the company will evaluate its success. So far, says Liscom, response has been good.

The Center handles inquiries about APL, Asynchronous Communications, BASIC, the BASIC Compiler, the BASIC Programming Development system, the *Cluster Program*, COBOL, DOS, FORTRAN, Logo, the Macro Assembler, Pascal, *Personal Editor, PCWriter, Private Tutor, Professional Editor*, SORT Version 1.00, and *Word Proof*.

The Center is open from 10 a.m. to 6 p.m., Eastern Time, Monday through Friday. Call 800-IBM-2700.

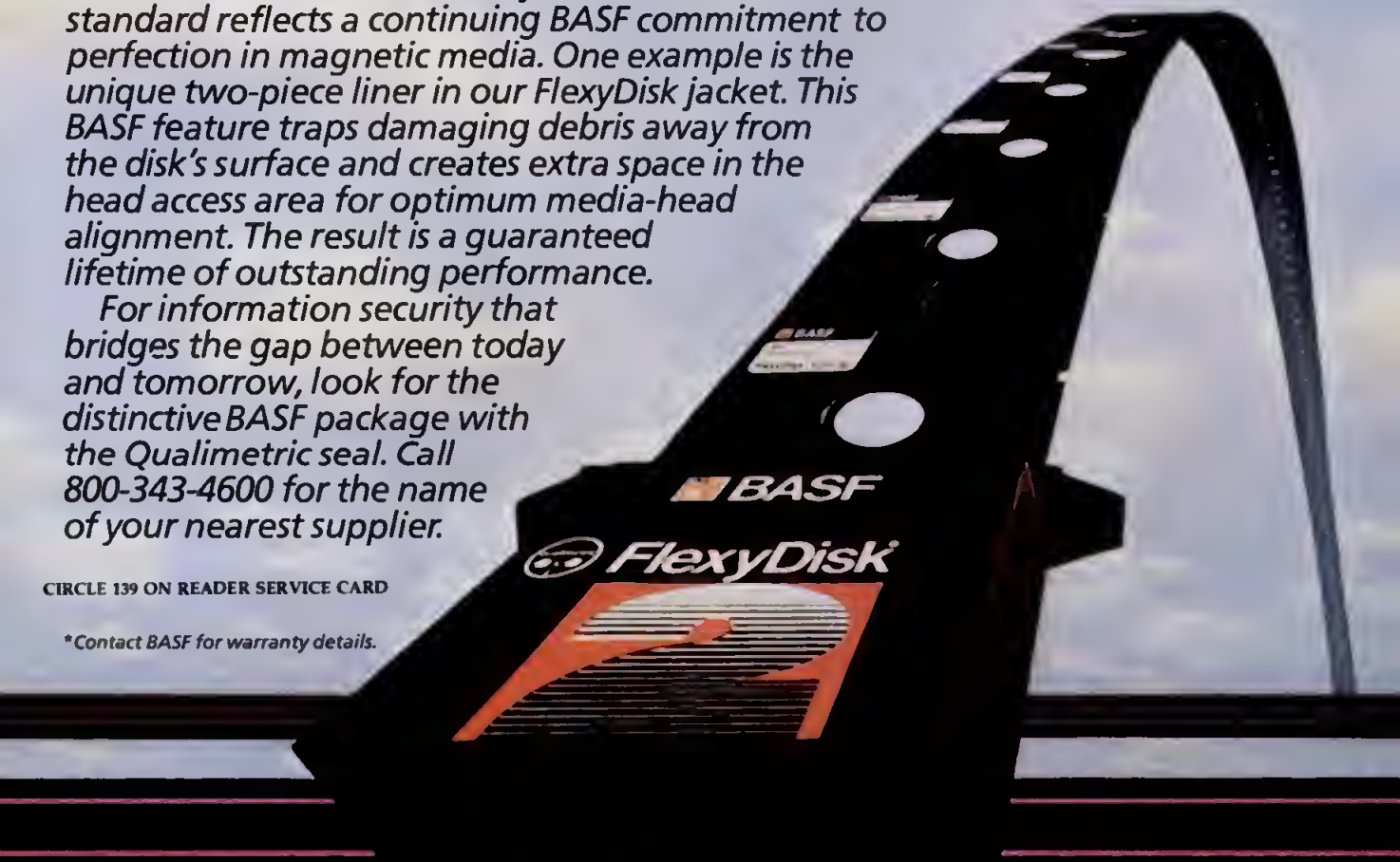
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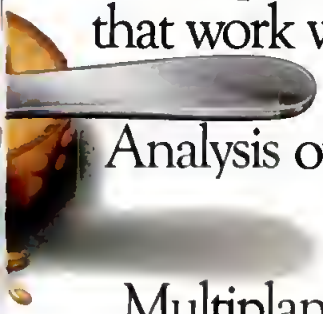
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QUADRAM
Quadboard w/64K to 384K ..... $ 289

PRINTERS & PLOTTERS

C. ITOH
Starwriter Letter Quality 40 cps $1195
Printmaster Letter Quality 55 cps ... $ Call
Cut Sheet Feeder (Feeds 200 sheets) .. $ 445

EPSON
(All Printers include GRAPHTRAX-Plus)
RX-80 (120 cps, 80 cols) ..... $ Call
RX-80 F/T (120 cps, 80 cols) ..... $ Call
RX-100 F/T (100 cps, 132 cols) ..... $ Call
FX-80 F/T (160 cps, 80 cols) ..... $ Call
FX-100 F/T (160 cps, 132 cols) ..... $ Call
Epson-IBM Cable ..... $ 30

HEWLETT PACKARD
HP—7470A Two Pen Plotter ..... $ Call
HP—7475 Six Pen Plotter ..... $ Call
HP-IBM Cable (works w/Lotus 1-2-3) .. $ 50

NEC
NEC 3550 Letter Quality 35 cps $1699
NEC 2050 Letter Quality 18 cps ..... $ 950
Bi-Directional Tractor ..... $ 235
Cut Sheet Feeder (Feeds 200 Sheets) .. $ 445
NEC-IBM Cable ..... $ 30

OKIDATA
Microline 83A (120 cps, 132 cols) ... $ 575
Microline 92 (160 cps, 80 cols) ..... $ 445
Microline 93 (160 cps, 132 cols) .... $ 749
Microline 84 (200 cps, 132 cols) .... $ 990
Plug n' Play ..... $ Call
Okidata-IBM Cable ..... $ 30

MONITORS

AMDEK
Video 300 Green Screen ..... $ 300
Video 300A Amber Screen ..... $ 145
Video 310A IBM Monochrome in Amber ..... $ 170

PRINCETON GRAPHICS
HX-12 RGB Hi Resolution Color ..... $ 499
Max-12 IBM Monochrome in Amber .. $ Call
SR-12 Hi Resolution Color ..... $ Call

QUAORAM
Quadchrome Hi Resolution Color .... $ 519

VIDEO—MONITOR BOARDS

HERCULES	Graphics Card ..	$ 359
PC COMPONENTS	Bi-Graphix I	$ Call
PARAOISE SYSTEMS	Multidisplay	$ 399
PC+ PROOUCTS	Colorplus	$ 419
STB	Graphix Plus ...	$ 399
OUADRAM	Quadcolor I	$ 199
TECMAR	Graphics Master	$ 499

MISCELLANEOUS

FTG—Light Pen ..... $ Call

KEY TRONIC
Typewriter Keyboard (KB 5150) ..... $ Call
Deluxe Keyboard (KB 5151) ..... $ Call

KOALA—Touch Tablet w/Software .... $ Call
KRAFT—Joystick ..... $ 49
MICROSOFT—Mouse w/Software .... $ 159
MOUSE SYSTEMS—PC Mouse ..... $ Call
T.G.—Joystick ..... $ 49

SOFTWARE

ALPHA
Oatabase Manager II ..... $ 199
Apple—IBM Connection ..... $ Call

ASHTON TATE
dBase II ..... $ 385
Friday ..... $ 179
Framework ..... $ Call

BEST PROGRAMS
PC/Professional Finance Program II .. $ 179

CENTRAL POINT SOFTWARE
Copy II PC ..... $ 35

OIGITAL RESEARCH
CPM/86 ..... $ Call
Concurrent CPM/86 ..... $ Call

FOX & GELLER
Quickcode ..... $ 169
dGraph (Requires Graphics Card) .... $ Call
dUtil (Utilities For dBase II) ..... $ Call

OZ
FINANCIER—Financier II ..... $ 119
FUNK—Sideways ..... $ 49
HAYES—Smartcom II ..... $ 99
IMSI—4 Point Graphics (Rated #1) ... $ 119

INDIVIDUAL SOFTWARE
Tutorial Set (IBM PC/XT and DOS) .... $ 49

INFORMATION UNLIMITED SOFTWARE
EasyWriter II System (See Specials) .. $ 195
Accounts Receivable ..... $ 299
Accounts Payable ..... $ 299
General Ledger ..... $ 299
Payroll ..... $ 369

INFOCOM—Zork I, II, III ..... $ 29

LATTICE
C-Compiler ..... $ 299
C-Food Smorgasboard ..... $ 110

LIFETREE
Volkswriter ..... $ 115
Volkswriter Oeluxe w/TextMerge ..... $ 179

LIGHTNING SOFTWARE
Master Type (Best Typing Tutor) ..... $ 39

LOTUS OEVELOPMENT
Lotus 1-2-3 (Version 1A) ..... $ Call
Symphony ..... $ Call

MICRO DATA BASE SYSTEMS
Knowledgeman ..... $ 350

MICROSOFT
C-Compiler ..... $ 349
Flight Simulator ..... $ 35
Multiplan (New Version) ..... $ 149
Multi-Tool Word ..... $ 275
Multi-Tool Word w/Mouse ..... $ 325
Pascal Compiler ..... $ 250

MICROPRO
Wordstar w/Tutorial on Disk ..... $ 259
Wordstar/MailMerge/CorrectStar/ StarIndex (ProPack) ..... $ 369

MICRORIM
R.base 4000 ..... $ 299
Clout ..... $ Call

MICROSTUF
Crosstalk XVI (for Hayes Smartmodem) ..... $ 109

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Trace 86 (Assembly Language Debug) $ 99
Ted (Program Editor) ..... $ 79

PETER NORTON
Norton Utilities ..... $ 55

ROSESOFT
Prokey (Newest Version) ..... $ 95

SOFTWARE ARTS
TK!Solver ..... $ 299

SOFTWARE PROOUCTS
Open Access ..... $ 399

SATELLITE SOFTWARE INTERNATIONAL
Word Perfect (includes Speller) ..... $ 299
P. Edit (Program Editor) ..... $ 95

SOFTWARE PUBLISHING
PFS/File ..... $ 95
PFS/Graph ..... $ 95
PFS/Write ..... $ 95
PFS/Report ..... $ 79

SOFTWORO SYSTEMS
Multimate (See Specials) ..... $ 295

WANG PUBLICATION
Random House Proof Reader 50K speller ..... $ 45

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SHIPPING (U.S.). For monitors, printers, and hard disk drives add 2% to all orders. Blue label and Next Day Air available. For all other items add $4. **Most orders shipped next day.**

ASAP Databases Allow Access to Article Texts

BY DARA PEARLMAN

BELMONT, Calif.—If you needed an article from *Women's Wear Daily* or *Scientific American*, would you be willing to pay $13 to $15 to see it scroll by on your computer screen? Information Access Company (IAC) of Belmont, California, is betting that you might.

Its two new on-line databases—Magazine ASAP and Trade and Industry ASAP—offer on-line access to the full texts of articles from 143 magazines and trade publications. (IAC is owned by Ziff-Davis, which publishes *PC Magazine*.)

Magazine ASAP features 56 magazines, including *Business America, Car and Driver, Changing Times, Creative Computing, PC*, and *Yachting*. Trade and Industry ASAP covers 87 publications, including *Advertising Age, American Banker, Billboard, Datamation, Graphic Arts Monthly, Implement & Tractor, PR Newswire*, and *Ward's Auto World*.

You can use the ASAP databases if you subscribe to Dialog Information Services. Coverage begins with the January 1983 issues of the magazines and will be cumulative.

Search Techniques

While not the first on-line collection of magazine articles, ASAP claims to be the first to offer "controlled vocabulary searching," an on-line search technique that allows you to request articles that fit into predetermined Library of Congress categories. For instance, if you wanted to see the latest news on IBM's corporate acquisitions, you could ask to see articles indexed by "IBM" and "merger." In all of the articles retrieved, IBM and mergers would be main topics.

ASAP databases also permit "free text searching." The database software retrieves all articles that use the words *IBM* and *merger*, which might include articles of no interest whatsoever.

According to Dolores Portugal, product manager for on-line products at IAC, the free text search can be useful if you need information on a topic that doesn't fit into a Library of Congress category. For example, if you wanted to know about "golden parachutes," a popular escape clause in employment contracts for top corporate executives, you'd use a free text search for the term *golden parachute*, because there is no Library of Congress category to describe that concept.

Dialog Know-how

To use the ASAP databases, you must know how to communicate with Dialog. You also need a pretty hefty budget for on-line information. Dialog passes along the bill from the data communication network of your choice (Telenet, Tymnet, or Uninet), which will range between $6 and $8 per hour. In addition, you pay $84 per hour while you're connected to the ASAP database.

How Much?

Portugal estimates that each article viewed on-line will cost between $13 and $15. Although that's not competitive with the newsstand, it might be cheaper than ordering an article through an information broker, she adds. If you don't mind waiting, you can cut some costs by telling Dialog to print the article off-line and send it to you by mail. This method will cost between $8 and $9 per article.

Search Helper

For the cost-conscious on-line searcher, IAC has another new product that simplifies the task of on-line searching.

The product is a software package called *Search Helper* that allows someone to retrieve information from six IAC databases offered through Dialog. The databases are Magazine Index, National Newspaper Index, Trade and Industry Index, Legal Resource Index, Newsearch, and Management Contents.

Using a series of menus, the program asks you questions about the information you want to find and then takes care of all of the mechanics for you.

At Carnegie Mellon University in Pittsburgh, Pennsylvania, undergraduates with no prior training have been able to use *Search Helper*, according to Thomas Michalak, director of University Libraries.

Search Helper works only with IAC databases because IAC is selling access to its databases together with the program. When you purchase a "software subscription" to *Search Helper* for a $200 annual fee (which includes upgrades and customer service), you also have to buy at least one "search packet subscription" of 700 on-line searches for $1,950. While the packet price might be intimidating at first, some quick arithmetic reveals that you're paying only $2.50 per search, quite a bargain in the high-priced world of on-line databases.

Has Its Limits

Still, *Search Helper* cannot completely replace the expertise of a top-notch searcher. *Search Helper* can only create searches using the Boolean AND operator; it doesn't know how to use OR or NOT. *Search Helper* will only retrieve 20 citations at a time, although it will retrieve the next 20 in a subsequent search. And while *Search Helper* lets you peruse the results of your search off-line and will print selected citations, it won't let you save them in a disk file for later use. Each new search erases the results of the previous search. Niemeier contends that even with these limitations, *Search Helper* can handle up to 80 percent of a library's on-line searches.

For more information contact Information Access Company, 11 Davis Drive, Belmont, CA 94002, (800) 227-8431. ■

The Spirit Continues



WASHINGTON—Stewart Brand of the *Whole Earth Software Catalog* is in good company. Cris Popenoe, the author of another counter-cultural compendium of the 1970s, also survived into the 1980s and, like Brand, is now cultivating computer data.

Originally published in 1976, her *Inner Development* was a 654-page guide to 11,000 spiritual books and records. Catalog-author Popenoe didn't merely list every title ever published about Astrology, Buddhism, Christianity, Divination, Fairy Tales, Gurdjieff, Humanistic Psychology, and so forth; she wrote introductions to each subject and revealing capsule reviews for nearly every book.

In the *Whole Earth Catalog*, Stewart Brand praised *Inner Development*, calling it "a *Whole Earth Catalog* (we don't say this very often) of spiritual books."

Today in Washington, D.C., Popenoe manages the Yes! Bookshop, and has seeded its shelves of spiritual works with a new breed of books—computer tomes. Popenoe leads readers into this different field with another catalog, *Book Bytes*, which lists and organizes over 1,200 computer titles—including over 100 specifically about the IBM PC. Continuing the tradition of her *Inner Development*, Popenoe has written reviews of each book and flags those that give the best introduction to each subject.

Cris Popenoe's *Book Bytes*, published by Pantheon Books of New York, is priced at $9.95. ■

INTRODUCING THE THREE SMARTEST TOOLS EVER CREATED FOR THE BUSINESS MIND.

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THE SMART SPREADSHEET WITH GRAPHICS.

The name of the game in spreadsheets is power. The Smart Spreadsheet with Graphics offers unmatched power and pictures, in one convenient package.

A truly remarkable feature of this smart software is how it "thinks" about using space. It's based on the "waste not, want not" principle.

For example, when a user places a number in row 50, column 10 of any other spreadsheet program, 500 cells worth of memory are immediately allocated—even if no value is entered anywhere else in row 50 or column 10. Consequently, 499 cells of usable memory are "tied-up" unnecessarily.

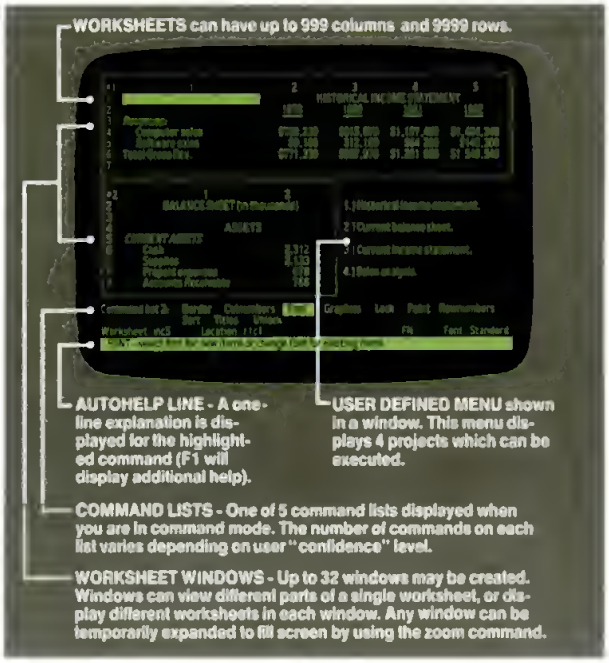
The Smart Spreadsheet will never let this happen. Its unique "sparse matrix" data structure would have only allocated one cell worth of memory.

This "space-saving" approach benefits all spreadsheet users. The Smart Spreadsheet puts at their fingertips four to ten times more usable memory. It's the only spreadsheet that can boast the capacity for up to 999 columns by 9999 rows.

In addition to its frugal approach to memory allocation, business users will find The Smart Spreadsheet offers powerful math and decision-making functions. It is extremely flexible. It will handle huge amounts of data, in many formats, while performing an unprecedented combination of business tasks.

To make sure the process doesn't become overwhelming (nobody's memory is that good), up to 32 windows can be opened to review worksheet sections or sections of other worksheets.

When it comes to graphics, few programs can compare to the full-color, full-featured package offered by The Smart Spreadsheet, which gives users a wide variety of visually appealing options.





GENERAL	999 columns X 9999 rows
	Up to 80 characters/cell (values and text)
	Up to 1920 characters/cell (formulas)
	Sparse matrix data storage
	Relational spreadsheets
SPECIAL FEATURES	Information management in spreadsheet form
	Multiple spreadsheets in memory at once
	Extensive calculation and decision-making, math, trig, statistical, date/time and decision (if-then-else, etc.) functions
	Project processing through command files
	Three user "confidence" levels
GRAPHICS	Supports full color
	1-, 2-, 3-D bar charts
	Pie and cake charts
	High-low charts, histograms
	Line, point and scatter graphs
	Merge graphs with text into word processing documents
	Edit graph capabilities before printing or plotting
	State-of-the-art printing and plotting
	Built-in "Slide Show" presentations

Graphics can be enhanced by multiple type styles on-screen and on printed or plotted output. Graphics options include: 1-, 2-, and 3-D bar charts; high-low charts; pie and cake charts; line, point, and scatter graphs; and histograms.

And just to keep things interesting, there's even a built-in slide show. Business users can show their business bosses some of their favorite pie-cake-bar-point-high-low graphs in a crisp, informative presentation, in any order, any combination, any time.

Even with its unprecedented data capacity, math functions and graphics capabilities, The Smart Spreadsheet with Graphics is still the easiest-to-use forecasting tool a business can own.

Of course this wouldn't be smart software if it didn't make life easier with features like multiple help and menu levels, total integration with other smart software, and the knack for remembering how to repeat a complex project.

THE SMART DATA MANAGER.

All businesses have three things in common. They all accumulate more data than they realize. They can never seem to find it when they need it. And if they could find it, they probably couldn't make much out of it.

The Smart Data Manager is the most intelligent data base available to the micro user.

From these observations, the data processing industry was born. But access to DP capabilities was limited.

Now The Smart Data Manager puts the benefits of data processing into the hands of business decision makers, providing them with an extremely efficient and versatile management tool.

Here, for the first time, is a relational data manager that can be operated by its own menus, user-defined menus, or built-in "common-sense" commands. Users can concentrate on what to ask rather than how to ask for information.

Because of its three "confidence" levels, users can start with the basics and work their way up with the peace of mind that they won't be inundated with menu options—until they're ready. They're also assured that HELP is always at hand.

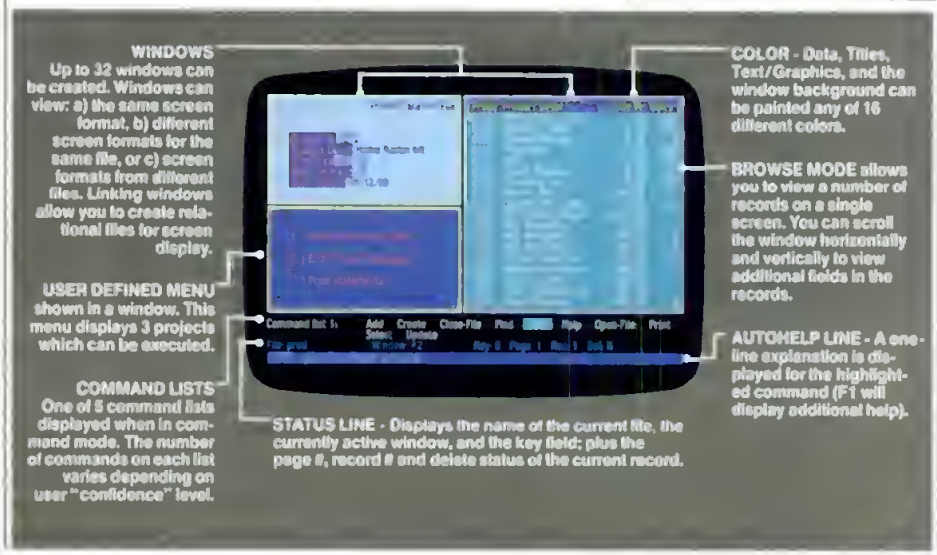
Naturally, The Smart Data Manager does a masterful job of filing, organizing, locating, interrelating, and retrieving all sorts of facts and figures, names and addresses. And it will remember exactly how to repeat all tasks for any repeated project.

Lists, reports, and forms can be generated with unlimited versatility and in a variety of type styles and sizes. Users can give that "smart" look to even the most perfunctory business paperwork.

Put to work with The Smart Word Processor and The Smart Spreadsheet with Graphics, The Smart Data Manager becomes the cornerstone for the most powerful, most versatile, and most innovative information management system ever created.



GENERAL	1000 characters/field
	4000 characters/record
	255 fields/record
	100,000 records/file
	Up to 15 key fields maintained
	Efficient B-tree organization
SPECIAL FEATURES	Up to 10 "screen views"/file with up to 15 pages each
	Security password entry at both screen and file levels
	Eight field types
	Character and numerical range verification
	Multiple criteria selects
	Prepared menus, custom-defined menus or command language
	Extensive calculation and decision-making capabilites
	Project processing through command files
	Three user "confidence" levels
RELATIONAL CAPABILITIES	Multiple file interaction
	Look-up data gathering
	Transaction data passing



MORE SMART FEATURES

The Smart Data Manager does more than handle standard data base applications It also has powerful field calculating abilities which help minimize data entry.

In addition, "if-then-else" logic can be applied to any field. And the report generator can print standard reports from any file, in any order. Or, users can output data to match pre-printed forms, labels, invoices, etc.

With these features, The Smart Data Manager solves virtually any data gathering problem, no matter how detailed or complex.

SMART SOFTWARE FROM INNOVATIVE SOFTWARE™

Until now, software has been designed to be powerful, versatile, and hard working. Unfortunately, this has usually meant hard work for the business user.

Despite technological feats, business software has not been known for meeting many human requirements.

Now with unmatched simplicity, smart software links the business user with the business system. It creates, for the first time, an environment that differentiates working hard from working smart.

Like a bright and resourceful assistant, smart software lets the user create, change, and duplicate tasks without constant supervision. It's eager to do the work. But always ready to learn more.

No longer is the user constrained by "unnatural" information flow, or a slave to reformatting data or commands. Nor is the user confronted with overwhelming study prerequisites before putting software to work.

Smart software is available in three applications: The Smart Word Processor, The Smart Spreadsheet with Graphics and The Smart Data Manager. Together, they provide an unlimited "applications bank." But each works powerfully by itself.

Smart software creates new meanings for "state-of-the-art," "integration," "user-friendly," and "full-featured." It sets new standards by which all other business software should be measured.

SMART SOFTWARE AT A GLANCE

GENERAL	Up to 32 windows/program
	Multiple files, documents, or spreadsheets in memory at once
	Supports mouse
	Supports full color
	Supports most popular printers and plotters
INTEGRATION	True integration - packages directly share information from each other and pass information automatically
SPECIAL FEATURES	Automatic project processing-remembers commands (not a macro)
	Three user "confidence" levels
	Prepared menus, custom-defined menus, or command language
	Multiple typestyles on-screen and in output
	Built-in time manager/appointment scheduler
	Built-in business/scientific calculator
	Extensive calculation and decision-making capabilities
	Keyboard macros
	Supports 8087 floating point processor chip
HARDWARE	IBM PC®, XT, COMPAQ™ or compatibles
	128K RAM, two double-sided disks or a hard disk

These unique features are standard for all smart software products. Each program also offers many exclusive application-specific features.

A BUSINESS TASK MASTER

Successful businesses operate by performing tasks and projects well. Most of their information demands involve repetitive projects and tasks.

Now, with a single keystroke, multi-faceted information projects can be repeated—start to finish—without repeating commands.

Think of it as "project processing." Smart software makes it a reality for microcomputers. It lets the software "learn" the user's chain of commands and repeat them, time after time, with a single prompt.

Using a unique "remember" mode, commands are recorded automatically.

Unlike a "macro" capability (which only remembers keystrokes), smart software has the "intelligence" to remember commands. It's the difference between remembering the letters in a word and knowing how to use the word.

INTEGRATION CUM LAUDE

Smart software integrates the user with the information system. It also integrates the programs—lets them "talk" to one another.

Smart software has the ability to pass information effortlessly between programs, and to store and retrieve information. The software (not the user) does the work of transferring data and translating instructions. Smart software lets the user concentrate on the task at hand rather than on how to make different programs work together.

THE STUDENT TEACHER

Despite its "learning" abilities, smart software has the patience to teach—in the school of "hands-on" experience. So even first time users can begin working immediately, and learn as they do.

Each program is structured into three ascending tiers of user "confidence." HELP is available at each level. No matter what's on the screen, one command presents detailed instructions.

HELP and menu information are consistent with the confidence level being used. Beginners work without confronting complex instructions and options. More advanced users can enter at any level they choose, and backtrack if they bite off too much.

But regardless of the "confidence" level, the user is continuously supported by full integration and project processing.

Folded edge of the page

Foldout slip-sheet

GbsSlipSheet-001

1. Open the foldout page
2. Insert this sheet with
   1. Front side touching the free page
   2. Arrow pointing to the fold
3. Slice the folded edge
4. Close the page and slip-sheet

Folded edge of the page

Inverted Foldout slip-sheet

1. Open the foldout page
2. Insert this sheet with
   1. Front side touching the free page
   2. Arrow pointing to the fold
3. Slice the folded edge
4. Close the page and slip-sheet

1. Follow instructions on the other side

Inverted Back

GbsSlipBack-001B

Back

1. Follow instructions on the other side

THE SMART WORD PROCESSOR.

GENERAL	Automatic "Flying Reform"
	"Cut and Paste" in or between documents
	Supports mouse
	Document size limited only by disk space
	Footnoting capabilities
	On-screen math capabilities
SPECIAL FEATURES	Multiple type styles on-screen and in output
	STET-second thought editing (undo)
	On-screen page breaks
	Project processing through command files
	Three user "confidence" levels



The Smart Word Processor (with the help of a quality printer), will deliver the same professional-looking and graphically appealing documents associated with dedicated word processing systems. But that's where the similarity ends.

Most businesses aren't in the business of word processing. So their word processing needs are very special. What they need is an extremely versatile writing, editing, and composing tool.

Not only that, they need a tool that can be used without long hours of special training or pages of highly technical instructions.

The Smart Word Processor is all those things and much more. It offers users a variety of type styles and sizes, as well as features like boldface, italics, small caps, underline, sub-script, super-script, even Gothic and Greek. Choices that meet the demands of the most fastidious, style-conscious writer.

The Smart Word Processor is the most versatile writing, editing, and composing tool ever designed for the business mind and the micro-computer.

Because bold is **bold**, italic is *italic*, and so on, the user can see the text on the screen exactly the way it will look on paper. This constant visual feedback lets the user write with just the right emphasis.

To help the train of thought, The Smart Word Processor's multiple windows allow many parts of a document (or parts from many documents) to be referenced simultaneously as text is being written.

Good writing demands good editing. Changing words, rearranging paragraphs, copying between (or within) documents—even footnoting—are the stock and trade of The Smart Word Processor. It even includes a "stet" feature for undeleting (to correct editing mistakes).

And as text is added, deleted, or moved about, the "flying reform" feature makes sure that everything is reformatted, automatically.

Depending on the "confidence" level (there are three), menu options will address only the level being used. Of course, HELP can be called at any time, at any level.

The project processing feature makes organizing complex business reports a snap. Either with its own text files, or with other smart software, this word processor will remember how it's been told to prepare a document—and do it again at the touch of a key.

Because it's fully integrated, The Smart Word Processor doesn't have a problem dealing with "foreign" data, such as graphics or data files. So any information can be effortlessly retrieved from either The Smart Data Manager or The Smart Spreadsheet with Graphics (or both). Once retrieved, anything and everything can be merged with the text being processed.

For example, when used with The Smart Data Manager, the business manager can retrieve historical data to generate informative reports.

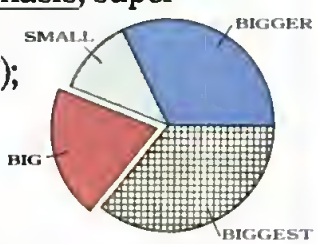
Then selected information can be summarized and used by The Smart Spreadsheet with Graphics to forecast future activity.

Finally, charts and graphs (from both historical and projected data) can be easily included in the document being prepared, either as stand alone items or surrounded by document text.

Just to round things out, The Smart Word Processor also includes a handy, on-screen calculator and a time manager/appointment scheduler. Business math calculations can be performed at any time, in a window on-screen, and inserted at any place in the document being processed. Appointments can be set, checked, re-checked, changed with the stroke of a key.

With the Smart Word Processor, what you see on the screen is what you get on paper.

You can make bold statements; *give a unique slant to your writing;* underline for emphasis; super-SCRIPT for mathematical equations ($E=mc^2$); sub-SCRIPT for footnoting$_1$; use ALL CAPS or SMALL CAPS.



You can even wrap text around graphs for a picture-perfect look.

PERFORATED FOR EASY REMOVAL.

THE SMART BUSINESS DECISION.

There are countless numbers of software products available today to meet the spectrum of business applications. But nothing compares with the way smart software meets the needs of the business user.

Together, The Smart Word Processor, The Smart Spreadsheet with Graphics, and The Smart Data Manager accommodate virtually every business application. And, for the first time, these needs are met in a "business environment" rather than a "data processing" environment.

Here is software designed so that the user can concentrate more on the business at hand and less on the microcomputer system. Here is software that links the business user with the speed and efficiency of the business computer—without "computer literacy" prerequisites.

With unmatched simplicity, smart software rivals the power and features of all other leading software packages. It also rivals the after-purchase support offered by all others.

Here are a few more reasons why smart software is the smartest choice in business software.

FREE VIDEO LEARNING CASSETTES
Purchasers of any smart software program can request a video tape learning cassette, absolutely free.

Available in both VHS and BETA formats, these cassettes highlight many operational points and special application features. Each video cassette covers the complete smart software series. With the aid of sight and sound, users can work along with video lessons.

It's also a great way for the purchaser of a single smart software product to preview other smart software.

Cassettes are ordered when the product registration card is completed and returned. Learning cassettes are free to smart software owners, or can be borrowed from participating smart software dealers.

USER HOTLINE SUPPORT
Registered smart software owners also qualify for a toll-free telephone assistance service. Between regular business hours (central standard time), users can consult with customer assistance representatives, should the need ever arise.

FREE TUTORIAL DISKS
Each smart software product includes a useful tutorial disk to guide users, step-by-step, through on-screen examples of special features.

Tutorials make it easy for even first-time users to start working smarter, faster.

And they're free.

$200 CASH-BACK OFFER
Purchasers of more than one smart software product are eligible to receive up to $200 in cash refunds from Innovative Software, Inc.

This offer makes purchasing the family of smart software even more affordable.

Cash-back coupons are packed with each product along with complete redemption instructions.

FREE PRODUCT UPDATES
Innovative Software, like most software manufacturers, periodically releases new versions of certain software products, incorporating new or improved features.

Unlike other software manufacturers, Innovative Software will supply updates to registered smart software owners, free of charge, for one year.

PRODUCT REPLACEMENT
Innovative Software also offers a Product Replacement Plan which goes into effect after the original 90-day product warranty period.

The Product Replacement Plan allows for replacement, at a nominal charge, of the original program diskettes, should they become damaged through normal use.

THE SMART CONCLUSION.

There has never been a software offering to match the scope and simplicity of smart software. Everything about the software and the way it is supported has been created with the business user in mind.

Project processing allows it to perform repetitive tasks without constant supervision.

Integration allows each of the smart programs to work in harmony with one another, giving the user virtually unlimited application opportunities.

And three "confidence" levels assure fast start-up and worry-free operation.

Given these unique features, smart software is, without doubt, the ultimate information management system. It sets new standards by which all other business software will be measured.

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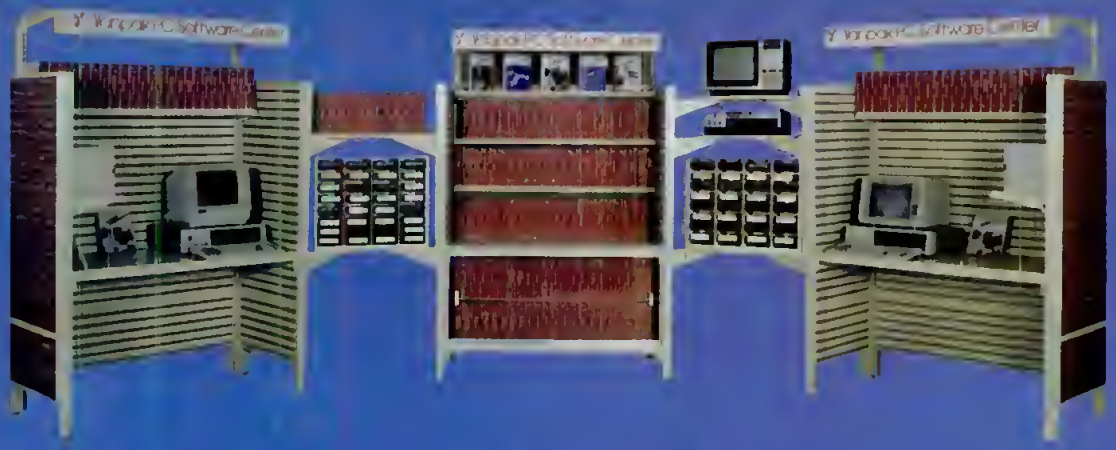


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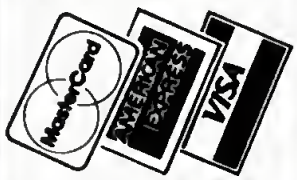
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PRODUCT REVIEW

Most Programs Fit Desq Nicely

A hands-on look at installing and running programs in Quarterdeck's operating environment

BY ROBIN WEBSTER

Desq
Quarterdeck Software
1918 Main St., Suite 240
Santa Monica, CA 90405
(213) 392-9851
Price: $399
Requires: 320K RAM, 5-megabyte hard disk

Until now, MS-DOS software has not been noted for its good manners. Many programs have been designed to operate as micro dictators; when loaded into memory, *they* are in charge and no other package can even take a peek.

With the launch of *Desq*, the multiwindowing program from Quarterdeck Office Systems, it looks as if no single PC-DOS program need ever reign supreme again (see "Will Desq Top Windows," *PC*, Volume 3 Number 12, page 33).

The version of *Desq* now available looks different in only a few ways from the product I saw about 8 months ago (see "Through an Open Window," *PC*, Volume 3 Number 7). It has been prettied-up to a large degree, and some details (such as the window border design and menu option selection keys) have been redesigned. It is also physically larger.

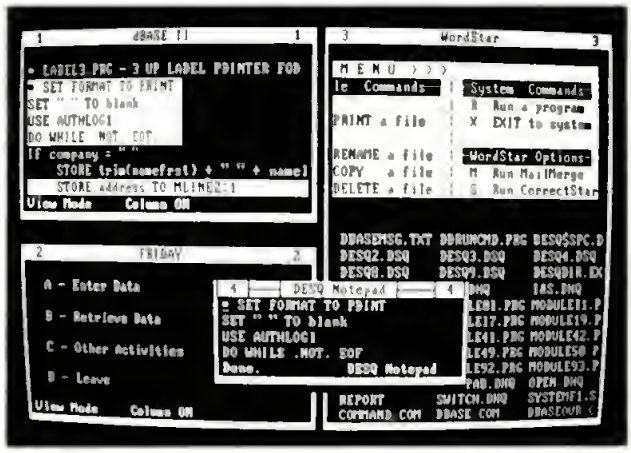
The version of *Desq* now being shipped requires a minimum of 320K RAM (256K for *Desq* itself and 64K for applications) and a 5-megabyte hard disk. To be really useful, however, *Desq* needs 512K of breathing space to support more than a couple of applications in memory at one time.

Color Preferred

My testing of the first released version of *Desq* was carried out on an IBM XT with 512K RAM and a color monitor. The color monitor is not essential—*Desq* will cope with a basic monochrome display set-up and with a monochrome screen linked up to a color/graphics monitor adapter. Obviously, though, the visual support provided by various application windows set in different, vivid color combinations is lost with monochrome displays.

A mouse can be used as a selection device with *Desq* (the Microsoft, Logitech, and Mouse Systems products are supported), but it is not compulsory. My test was carried out without a mouse, but I would recommend using one if you intend to work with many applications—and therefore many windows—on the screen at one time. It facilitates selection of windows and their contents.

To switch between windows without a mouse, you must first tap the Alt key and then enter the number of the window you wish to work with. (For example, Alt-1 makes window 1 active.)



Every window is identified by a unique number, which is very important since you can end up having different windows with the same name if you are not careful. The active window is always in front of all other windows; it has special bars in the top window border.

According to Therese Myers, president of Quarterdeck, first-time or naive users should not try to install applications or set up complex interconnections between applications all by themselves. Myers feels this is one job best left to those skilled in the dangerous art of deciphering software and hardware manuals.

While there is much sense in this, the *Desq* manuals themselves are quite easy to follow and installing the system on my XT presented no problems.

Desq Tricks

You must be familiar with DOS 2.0 file structure commands so that you can tell *Desq* when to change directories, and so forth. It also pays to read the installation notes in the *Desq* manuals carefully since there are a few hints on how to make *Desq* operate as smoothly as possible.

Desq comes on four disks: the *Desq* Starter Disk, two additional system disks, and the Agent Library disk.

Inserting the Starter Disk into drive A: and typing INSTALL begins the installation. It took about 5 minutes to copy all the necessary files onto the hard disk from the Starter Disk. On checking drive C: (the hard disk), I realized that *Desq* had automatically created its own DOS 2.0 directory called DESQ. All *Desq* files were stored in this directory.

Getting to Work

It is possible to start working with *Desq* in a small way at this point, although no MS-DOS applications have been installed. Its menus will function, you can type text into Desq Notepad, a simple screen-based editor, and you can manipulate DOS files on any attached disk drive via *Desq*'s rather impressive File and Print main menu option.

This last option is a great improvement on the way in which PC-DOS directory information can be handled. Have you ever wanted to sort your directory in a meaningful way? Have you ever wanted to move among the contents of a directory and do all the things PC-DOS allows you to do by choosing them from a menu? If so, Quarterdeck's handling of these facilities will please you.

Windowing systems can appear to the user in a number of ways: icons that are pictorial representations of a program or document, as with the Apple Macintosh; a mixture of menu options and "almost icons" (simple graphics), as with the Visi On system; or a ubiquitous main menu and a host of application-dependent submenus, as with *Desq*.

Agents Aid Applications

One disk supplied by Quarterdeck is labelled the Agent Library. An agent, in *Desq* parlance, is an easy-to-use interface that provides support for a particular application. So if an application provides for the deletion of files by some contorted control key sequence, a *Desq* agent will provide a much sim-

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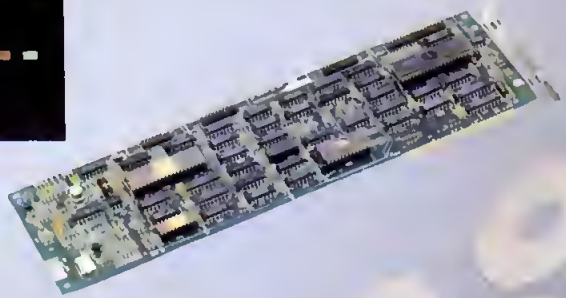
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Desq *(continued)*

pler one-key method of doing the same task.

Agent support is available once you have installed the relevant file from the Agent Library disk. The first version of *Desq* comes with 12 agents that provide support for the so-called "hit" packages (*dBASE II*, *1-2-3*, the *PFS: File*, *Report* and *Write* programs, *VisiCalc*, *Fast Graphs*, *MultiMate*, *Multiplan*, the *SuperCalc* programs, and *WordStar*).

Others will undoubtedly follow, but you don't have to wait. By choosing the Install and Setup menu option and telling *Desq* that you want to create your own agent, it is possible to install almost any PC-DOS program in the *Desq* environment.

Installing WordStar

I decided to install the *WordStar* agent from the Quarterdeck disk first, since I had loaded all the necessary *WordStar* files in the root directory on my XT's hard disk. The installation was, again, very smooth, taking about 5 minutes to complete. Upon opening a *WordStar* window, however, I was greeted by the error message "File WSMSGS.OUR not found."

When I traced the problem, it seemed to me that *Desq* initially looked for the WS.COM file in the root directory but then returned to the main *Desq* subdirectory, where, of course, it couldn't find any of the other *WordStar* files. This caused all sorts of problems, requiring me to press the Esc key more than a few times. In fact, at one point the contents of the *WordStar* window "fell" out of the window border and lay scattered all over the screen.

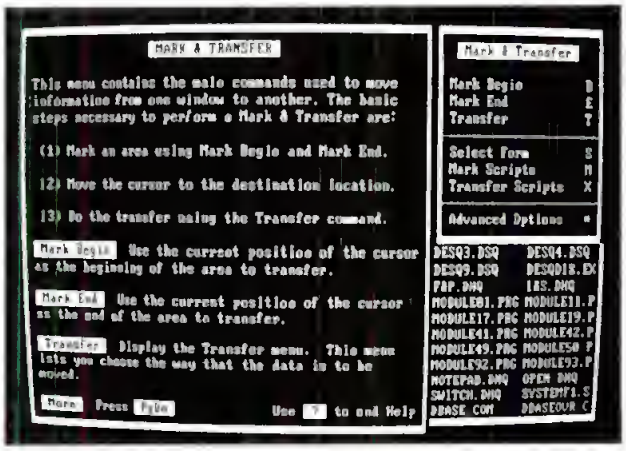
A quick solution was to copy the *WordStar* files over to the *Desq* directory. *Desq* seemed to be much happier and I could use *WordStar* without difficulty.

Keying Functions

Quarterdeck has decided to go with letters instead of function key numbers on its command menus. While using *WordStar*, it became obvious to me that all was not well.

Desq's agent provides a menu for *WordStar* that includes features like Help, Left Margin, Underline, and Bold. You call up the menu by pressing the Alt key once while working in a *WordStar* window.

I pressed the F1 (Help) key at this point, but instead of any kind of special help text appearing, the Ctrl-S (Save File) command was issued. Pressing the F3 (Left Margin) function key did not produce the required result either; instead of displaying the expected prompt asking for the location of the left margin, *WordStar* merely deleted the character to the left of the current cursor location.



Instead of the *Desq* operation taking effect, *WordStar's* own function key assignments were taking precedence. This was a bit confusing. Simply using conventional keyboard commands, *WordStar* worked as expected and its performance was really no different from when it is used outside of *Desq*.

Entering the Unknown

Out of curiosity, I installed a demo version of the *Intecalc* spreadsheet system from Schuchardt Software. The *Intecalc* demo was self-running; the disk contained an AUTOEXEC.BAT file that loaded all the necessary files to start the demo.

I decided to leave *Desq's* default 64K memory allocation for *Intecalc* alone for the moment and tried to run the program. On opening the window for *Intecalc*, I watched the batch file load. (Having installed the agent for *Intecalc* I could now start the program by simply entering IN for *Intecalc* when given the relevant prompt.) Unfortunately, all I saw was a brief complaint that *Intecalc* was "too big to fit in memory."

After setting up a higher memory space for *Intecalc*, I managed to run the program within *Desq* and encountered only a few minor problems. *Intecalc* tried hard to remain within the window borders set up by *Desq*, but would occasionally write a random character to the bottom right-hand corner of the screen, sometimes on top of other window contents that occupied that space.

Scrolling within the window borders tended to cause the window contents to move around erratically. These problems are probably a result of *Intecalc* bypassing standard PC-DOS BIOS calls or handling them in some unusual manner. *Intecalc* is not mentioned in the Quarterdeck "approved list" anyway.

Other programs I've used successfully with *Desq* include *SuperCalc*, *1-2-3*, *dBASE II*, and *Friday!*. While it was not possible to put them through all their paces under *Desq*, I was impressed by how much I could do to make such programs work together.

Mark and Transfer ("cut and paste" in other systems) operations allow *Desq* users to take a collection of data from one type of application program and to transfer it to another, just as they might move a block of text around within a word processing document.

It is not a one- or even two-shot process. You have to place the cursor at the beginning of the data you wish to transfer, select the Mark and Transfer menu, mark the beginning of the data (whereupon the menu disappears), place the cursor at the end of the data area to be moved, call up the Mark and Transfer menu again, mark the end of the data (whereupon the menu disappears again), switch to the destination window, call up the Mark and Transfer window a final time, and select the transfer option.

I may have labored the point a little, but this is just an indication of the way in which *Desq* goes about many procedures—whether transferring data or changing the background color in a window.

A very important feature of *Desq* is its Learn and Scripts facilities. Although *Desq* does make the job of integrating diverse packages quite easy, it would be a waste of energy to set up links between programs every time you boot up the system. Learn puts *Desq* into a mode that records everything you do—mistakes and all. Without such an ability it would be just another pretty window-ing package.

If you link three or four packages together to create a hybrid accounting package, the learn facility will store the sequence of events in the form of a named file, called a Script.

A Script can be repeated a specified number of times and can include "pauses" that temporarily halt the Script to ask the user to input variables. The Learn and Scripts features made *Desq* viable as a program integrator.

While I had problems getting some programs to work as I wished, this is a function of both how well each product is installed and how well it is suited to the *Desq* environment. *Desq* itself was very robust and never actually crashed. The only danger is that it is extremely flexible—so flexible that you must pay great attention to details if you want all the various parts to mesh together successfully. I like the product and think that it is well worth the $399 asking price.

Desq is rather like a teacher in charge of a playground full of children. Most of the children play happily, but occasionally some are just not manageable.■



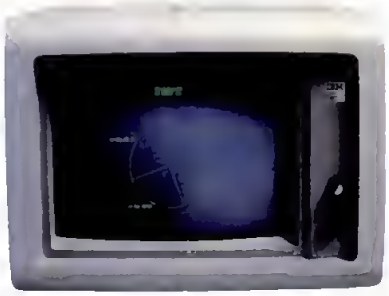
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	TLI	Hercules	CCS
Bit-mapped graphics	Standard (2 page)	Standard (2 page)	Option (1 page)
132-column x 44-row spreadsheet	Standard	NA	Standard
IBM display compatibility	Standard	Standard	Standard
Parallel port	Standard	Standard	Standard
Serial port	(2) Standard (one std./one opt.)	NA	NA
Clock/calendar w/battery	Standard	NA	NA
User-expandable (One option per UltraPAK board):			
IBM disk controller w/wo 256K memory	Option	NA	NA
384 K memory w/RAM drive	Option	NA	NA
IBM color/graphics* or high resolution color graphics* (640 x 400 w/16 colors)	Option	NA	NA

*For simultaneous display on a separate color monitor

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PRODUCT REVIEW

Compu-Chef: Now You're Cooking

BY MARK MALAMUD

Compu-Chef
DeAmicis Software Development
Oceanside, CA 92056
(619) 758-4766
List Price: $30
Requires: 128K RAM, one disk drive, PC-DOS.

Remember this episode of *The Honeymooners?*

"Oh, Chef of the Future–Can it core *a* apple?" Ed Norton asks innocently, dressed as the Chef of the Past in Ralph Kramden's TV commercial for a new-fangled, triple-purpose kitchen utensil.

"Can it core *a* apple!!!" Ralph replies confidently, brandishing forth what looks like a futuristic, multipronged fork, "Why, let us compare the ways of the past with the ways of the future...."

And so begins yet another failure for Ralph Kramden, the bus driver with big dreams of success but little chance at it. For no sooner than Ralph's words have been spoken than the Chef of the Past, armed only with an old-fashioned apple corer and determined to demonstrate the inefficient ways of antiquity, cores an apple with acrobatic dexterity and super speed, the likes of which the Chef of the Future never even dreamed possible. So much for the kitchen of the future.

Which brings us to *Compu-Chef*, a new product from DeAmicis Software. Created by a chef at a hotel and spa in Carlsbad, Arizona, *Compu-Chef* is essentially a cookbook on disk. It contains 90 recipes in categories ranging from cold appetizers to hot entrées and includes such exotic continental fare as salmon sauté with creamy herb sauce, zabaglione with brandy, and Cherries Jubilee.

Compu-Chef automatically calculates the quantity of ingredients necessary to prepare between 1 and 50 portions of any dish. It also allows you to create and save your own recipes (up to 18 lines per recipe) on a separate disk so you can build a private recipe library.

For those who need reference materials in the kitchen, the program also contains some interesting appendices including a comprehensive list of culinary terms and herbs. There is also information about caloric content and cost-per-portion of certain dishes.

Hold that Recipe

Although *Compu-Chef* has some intriguing features and is fun to browse through for 30 minutes, is it ultimately any better than a cookbook and card filing system? The only thing the program seems uniquely suited to is the calculation of the proper amount of ingredients necessary to prepare a specified number of servings. Of course, a little basic math on the back of a napkin can accomplish the same task and save $30.

Also, to make the program's appendices easy to use, *Compu-Chef* advises you to print a hard copy of the data. How is this any better than having a book in the first place?

By the Book

Finally, who keeps a PC in their kitchen? Granted, you don't need a PC next to your stove to make use of *Compu-Chef*, but then, who keeps their cookbooks in the den? All in all, *Compu-Chef* is a sincere but ultimately awkward recipe index.

So it looks as if your grandmother's cookbook has not gone the way of the abacus—at least not yet. The computer may someday make the household chef very happy with cross-references, linked lists, instantaneous calculations, and direct lines to *Cordon Bleu* in Paris. But today, when PCs can be found in almost any part of the house *but* the kitchen, publishers of best-selling cookbooks have nothing to fear. The Chef of the Future is still far away.

But, certainly *Compu-Chef* will avoid Ralph and Ed's dilemma of how much rice is nice. Their solution was at least—*at least*—a cup of dry rice for each person, because, as they reckoned, "We all like rice." ■

Speaking of Computers: Laughable Data

"Then there is Apple with its 20-page inserts to try to convince you that a black-and-white monitor on a 16-bit computer with 80K available to the software writer with a single disk drive and no numeric key pad or cursor keys is great! If you think about it very much, you'll laugh."

John V. Roach, keynote speaker at COMDEX in Atlanta, Georgia, May 1984

Word Processing Lowers Stress, But Does It Raise Salaries?

DETROIT—What do 507 secretaries think of word processing? They love it—or at least 83 percent do, according to a survey by Kelly Services, Inc. on secretaries' attitudes. Only 16 percent have mixed feelings about word processing and none say they "hate it."



Word processing makes work less stressful, say 63 percent of the surveyed secretaries, and 76 percent say that the word processor allows them to "spend less time typing and more time doing work that involved more responsibility and decision-making." As to fears that electronic office equipment might eliminate their own jobs, only 5 percent are "very" or "somewhat" concerned.

Does electronic equipment open up new opportunities for secretaries? Sixty percent think so, and 12 percent think it's likely they'll become computer programmers. Already, 21 percent know how to program a computer using a language like BASIC or COBOL; among secretaries under 25 years old, 31 percent can program. We wonder if they'll find a faster track to hacking now that IBM offers its traditional dedicated word processor, Displaywriter, as software that runs on the more-programmable PC.

Comparing the answers to several questions in this survey reveals that secretaries might become disillusioned with word processing if they look too closely at the bottom line. Although 88 percent say that learning about word processing has influence on increasing a secretary's salary, only 30 percent have actually received pay increases as a result of word processing skills.

Even though the corporate name of Kelly Services, Inc. plays down the company's "Kelly Girl" image, this survey reveals that being a secretary is still mainly "women's work." Of the secretaries that were interviewed, nearly all—99 percent—were female. And while 45 percent would recommend a secretarial career to a daughter, only 11 percent would suggest this profession to a son.

The full *Kelly Report on People in the Electronic Office*, is available at no charge from Kelly Services, Inc., Public Relations Dept., GPO Box 1179, Detroit, MI 48266.

—James Langdell

PRODUCT REVIEW

Compucard: Checking Your Rolodex

Compucard
Rolodex Corporation
245 Secaucus Rd.
Secaucus, NJ 07094
(201) 348-3939
List Price: $49.95
Requires: 64K RAM, two disk drives.

Rolodex, the company that brought you the popular Rolodex card-filing system, recently came out with its contribution to the computer age: *Compucard*. This computerized card-filing system streamlines the problem of duplicating, crossfiling, adding to, and otherwise handling the Rolodex filing system.

The package comes with a system disk and short, easy-to-read manual. The Rolodex cards, which are sold separately, are attached at perforations for use by most printers.

The software has a few bugs. On a double-drive PC, the program refused to run unless there was a data disk in the B: drive—even though a file containing 20 entries fit on the system disk. And although the manual states that it is compatible with hard disk systems, the software balked on a 512K PC-XT, insisting that a minimum of 64K RAM was needed to run the program.

Compucard is driven by a number of menus. After setting up a card set by naming it and choosing a card size, printer type, print size, and set size, you are ready to begin entering data. There is no way to edit the setup once it is entered. If you make a mistake during the process, the only way to alter it is to delete the original setup.

The program offers a small mockup of a typical Rolodex card. Either type in your information in any fashion or set up what the program calls a zyp template, which allows you to create specific record entries.

```
+-----+-----+-----+-----+-----+-----+------
| NAME: GEORGE WASHINGTON, ESQ              |
| CO: PRESIDENTS, INC                       |
| ADDRESS: 1 WHITE HOUSE RD                 |
| CITY/STATE: WASHINGTON, D.C.              |
| ZIP: 02121                                |
| PHONE: 000-0000                           |
-------------( )-----( )--------------
   C-change E-erase P-print Q-quit

     B. BROTHER          1984 LTD
     J. ROCHESTER        GOVERNNESS, INC
     J BROCKHURST        JUNGLE DREAMS
     JOHN STYLES         PICKWICK CLUB
     SAMUEL PICKWICK     PICKWICK CLUB
---> MARTHA              PRESIDENTS
     ZYP TEMPLATE1       ZYP TEMPLATE1
     * End-of-List *       *     *
```

These tabs and a variety of control codes can be used to alter or delete records or search for duplications. But Rolodex didn't see fit to include any sort of help menu at the bottom of the screen, relying instead on an easily lost "Quick Reference Card".

Once the file is completed, *Compucard* will print it out neatly. The program also automatically prints the dates of when the card was first entered and of the last update.

Compucard is a handy system for offices with many common phone numbers that must constantly be organized or updated. It satisfies one to see a multitude of Rolodex cards being neatly and quickly printed. It's too bad that the program is marred by so many easily correctable problems.

—Barbara Krasnoff

Calendar of Events

DATE	EVENT	COMMENT	LOCATION	CONTACT
June 28–July 1	Milwaukee Computer Showcase Expo	Hardware and software.	MECCA Milwaukee, WI	The Interface Group 300 First Ave. Needham, MA 02194 (800) 325-3300 (617) 449-6000
July 9–12	1984 National Computer Conference	Granddaddy of them all—hardware, software, seminars.	Las Vegas Convention Center Las Vegas, NV	AFIPS, Inc. 1899 Preston White Dr. Reston, VA 22091 (703) 620-8940
July 11–12	Personal Computer Local Network Seminar	Seminar on PC local network market.	Hyatt Regency San Francisco, CA	Architecture Technology Corp. P.O. Box 24344 Minneapolis, MN 55424 (612) 935-2035
July 16–17	Computer Security Workshop	Workshops on security needs and concerns of IBM, compatible users.	Marriott Crystal Gateway Arlington, VA	Computer Security Institute Dept. IP, 43 Boston Post Rd. Northborough, MA 01532 (617) 845-5050
August 16–17	Local Area Networks	In-depth look at local area networks.	Ramada Inn—Old Town Washington, DC	Institute for Advanced Technology Control Data Corp. 6003 Executive Blvd. Rockville, MD 20852 (800) 638-6590 (301) 468-8576

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Software—Free for the Asking

Free software? Yes, and you can get your hands on it from several sources without resorting to piracy. PC users have written programs and placed the code in the public domain, giving legal authority to fellow users to copy, run, customize, and improve the software. Programming utilities, games, fancy screen illustrations, and even full languages, word processors, database managers, and spreadsheets are available.

Some of the most popular and powerful programs in the public domain, such as *PC-File*, *PC-Talk III*, and *CHASM*, are "user supported" products. Although you can obtain any of these programs free through public domain channels, the software's author asks that you send a donation if you like it.

If you don't know where to find public domain or user supported software, the following sources can provide information and even the programs themselves.

Many PC users groups distribute public domain software to their members. Contact a local group to find out what programs are in its library.

Free as the Air

Another way to obtain public domain software is to dial up a PC user bulletin board that offers programs for downloading to your PC.

One book that dips into this ever moving stream of telecommunications is *Free Software for the IBM PC* by Bertram Gader and Manuel V. Nodar (Warner Software/Warner Books, New York, 468 pages, $8.95). This book lists all the files on over 40 bulletin boards devoted to IBM PC users.

Gader and Nodar also thoroughly explain how to contact a bulletin board and how to set one up. They point out that there's even a piece of public domain software, called RBBS-PC, that helps you set up a public domain software bulletin board of your own.

Pulling a useful or entertaining program out of thin air from a bulletin board is the closest thing to entirely free software, but the long-distance charges can add up if a long program you desire can't be obtained from a bulletin board close to home. If you'd rather get your software on disks sent through the mail, we can suggest two good sources.

One is the PC Software Interest Group (PC-SIG), which publishes the *Directory of Public Domain Software for the IBM PC*. The PC-SIG offers over 135 disks of software, most with at least a dozen programs or files, which are described in its 110-page directory. Programs can be obtained from PC-SIG by sending $6 per disk plus $4 per order for shipping. This price covers the disk and time that go into making you a copy of this not-quite-free software. The directory costs $4.95 (plus $1 for postage) from PC-SIG, 1556 Halford Ave. #130, Santa Clara, CA 95051, (408) 730-9291.

Another publication that lists public domain software is *IPCO Info*, the bimonthly newsletter of International PC Owners, Inc. (Box 5100, Poland, OH 44514). Each issue catalogs IPCO library of about 300 public domain programs, which you can order for $3 per program and $6 per disk; about 20 disks with fixed selections of related software (such as all games or all graphics) for $15 each; and 16 user-supported "freeware" programs for $6 each.

IPCO Info describes individual public domain programs more thoroughly than do the other publications. Each issue also reprints many pages of tips, comments, and gossip culled from messages left by PC users on bulletin boards. Subscriptions are $20 for six issues, $30 if you want issues sent by first class mail.

—James Langdell

Duped by CorrectStar? Here's Why

A number of *PC*'s attentive readers are puzzled by the MicroPro *CorrectStar* "Winning-Words" Instant Winner Game that ran as an advertising insert in *PC*, Volume 3 Number 10. The contest promoting MicroPro's new spelling checker offered prizes to people who found one or more of the words *CorrectStar*, *ocean*, *prism*, *idol*, and *array* hidden in a grid of eight letters across and ten letters down. The Grand Prize for finding all five words spelled correctly was $4,000 or a luxurious week in Paris for two.

Many of *PC*'s readers jumped at the chance for a week on the Continent. When they scratched at the ink-coated grid in hopes of uncovering *CorrectStar*, however, their mental spelling checkers flashed red. "I for one cannot fit an 11-letter word in an eight-by-ten matrix. Could you please tell me what MicroPro had in mind?" wrote William McDonald of Salem, Virginia, one of several readers who wrote to *PC Magazine* questioning the validity of the contest.

Our readers are right: You can't fit an unbroken 11-letter word horizontally or vertically or even diagonally in a grid whose largest dimension is ten letters.

The answer to the problem, according to MicroPro, is to use a little creative spelling. After all, says spokesperson Judi McClean, the rules don't object to listing the words *Correct* and *Star* in discontinuous sections.

"We are sorry your interpretation of the rules of this game created some confusion," reads a letter MicroPro has drafted in response to readers experiencing gridlock. "As you can see on the copy of the Grand Prize-winning card, *CorrectStar* appears horizontally. Even though it appears on two lines, the word is spelled correctly and horizontally as stated in the rules. As per the rules, all major prizes in this game will be awarded."

The decision to break *CorrectStar* into sections was made because of size limitations for magazine advertising inserts, McClean says. ■

Smart Gets Project Processing

OVERLAND PARK, Kansas—*Smart* software sounds like a good idea, if only because of its name.

In the rush to carve a niche in the integrated software market, Innovative Software, Inc., here has added project management capabilities to its $895 integrated bundle.

Innovative, which has been successful with its *TIM IV* database manager, calls the added capability "project planning." The company envisions that this will appeal, for example, to a credit manager who needs to send dunning letters to anyone owing more than $1,000. The manager would initially set up the project using *Smart* macros; the system would first use the spreadsheet portion to determine who owes $1,000 that month, and then transfer that information to the word processing package to prepare the letters, explained Michael J. Brown, Innovative's president.

The project planning capability enables users to take an old project and revise it to handle the latest situation. *Smart* users can view and work on multiple files running in tiled windows on a color monitor and transfer data from other existing packages.

Help facilities are extensive, but as users become more expert at manipulating the sophisticated word processor, the super spreadsheet with high-resolution graphics, and the data manager, they can cut back on the amount of help they receive. On-line commands have been divided into three levels of complexity so that novice users are not confused by an array of options as they begin to use the software, but are not limited either as they become more proficient.

Smart is currently available through its dealers as three individual modules: the word processor is $395; the spreadsheet-and-graphics module is $495; and the data manager is $495. ■

Micro-to-mainframe:

Before you settle for a simplistic solution, ask a few serious questions.

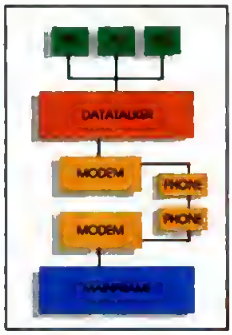


Choosing a micro-to-mainframe communications system is no game.

So before you tay araund with "easy" salutians, ask some serious questions.

Will this product support full IBM Terminal Emulation?

Make sure the system can emulate remate batch and interactive IBM terminal systems.



Suppose something goes wrong with the unit?

The company should affer a 30 day maney-back guarantee and a 12 month warranty that includes a free replacement unit.

Whot about future product development?

Make sure the products you're going ta need soon will be available soon.

Does the company offer a variety of products?

You should have yaur choice of stand-alane frant-end processors, IBM PC or XT boards, or an OEM board. All ready to run an the mast popular operating systems.

Who am I dealing with anyway?

How long have they been in business? The langer, the better.

How much is all this going to cost?

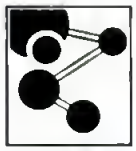
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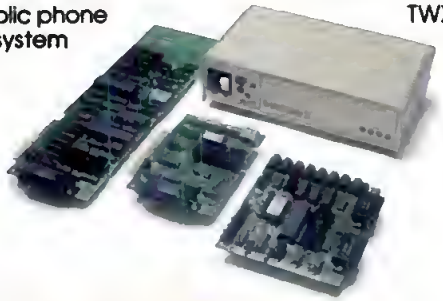
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CIRCLE 185 ON READER SERVICE CARD

People in the News: Jeff Garbers

The creator of Infoscope keeps the human side of software in his view

BY JAMES LANGDELL

ATLANTA—Imagine that! A young programmer who has used computers most of his life has created a program that lets people imagine they've understood computers all their lives. Competence is rarely so contagious, but 23-year-old Jeff Garbers' talent rubs off on users the right way through *Infoscope*, his data management program, now available from Microstuf, Inc., of Atlanta. (See "A Scope for your Micro" in this issue for a review.)

Infoscope lets you start right in, organizing and sorting data in various ways without having to define everything in advance. You can add new fields to a file at any time and the program automatically expands fields to fit the longest item. "Early on," says Garbers, "you don't have to make decisions where you debate with yourself, 'Well, I don't want the name fields to take up a lot of memory, but I don't want to alienate any eastern European friends by chopping off their long names.'"

Infoscope also offers help windows for all occasions, but usually you can enter the first command that comes to mind and the program will do what you want. These uncommon accomplishments were made possible by Garbers' painstaking attention to the human side of software.

Computer skills came easily—and early—to Garbers. He recalls that when he was 11 years old he saw some of his father's IBM manuals, became interested in them, and taught himself COBOL.

Human Factors

As fluent as Garbers became with computers, he realized most users don't have the interest or patience to do what he had done—take the time to figure out obscure programs.

Garbers' point of view was nurtured in his studies with Dr. Albert Badre of Georgia Tech. While working on his doctorate, Garbers took a computer science course in human factors from Badre, who "opened my eyes to the potential of programming for human beings." The class explored how programmers could apply aspects of cognitive psychology.



Badre assigned his class the project of programming a home library system—but he added a cognitive twist. "He split us into two groups and didn't tell either group what the other was doing." Garbers' group was told to write the user manual and then the program; the other group followed the usual fashion of writing the program code and then documenting it.

What did this exercise prove? Garber said his group's program was far easier to use. "By doing the documentation first we were forced to consider a lot of usability issues before we started coding. Unfortunately, that's kind of awkward to do in the 'real world.'"

Birth of a Program

Even so, Garbers and Badre believed their classroom ideas could be used profitably in the real world. They founded Userview Corp. and set about developing *Infoscope*, a product that would "incorporate all this cutting-edge usability stuff we'd been investigating." As president of Userview, Garbers soon discovered that there was a conflict between running a company and being a programmer. "Writing a program is like carrying a child," he says. "While you're doing it, it's the only thing in life that really matters."

In 1982, Garbers the programmer was able to focus on his software after Garbers the president turned Userview's administrative side over to Microstuf, Inc., makers of *Crosstalk*.

Garbers worked on *Crosstalk XVI*, the latest release of Microstuf's communications package. He claims he was able to put much of his programming philosophy to practical use in the new version.

With his own creation, *Infoscope*, Garbers had a freer hand to apply human factors concepts even further. Garbers and Badre paid attention to little things—with a passion. "I doubt that anyone in the software development business," claims Garbers, "sweat and fought and argued as long as we did over one word for a particular command. At first there were different terms for deleting records and deleting fields, but the two words were so close that people tended to confuse them. We finally decided, 'Well, heck! Just use the same word, DELETE, and have users specify whether they want to delete a record or a field.'"

The speed and flexibility of *Infoscope* is possible because the program operates only on files that can fit into the PC's active memory. After Garbers decided that speed and flexibility were his primary design goals, "I knew immediately that there was no way *Infoscope* could involve disk drives except for loading the program and storing complete files."

When a file is nearly too large for *Infoscope* to handle, it's easy to transfer the date file over to another program that can handle it. "If an *Infoscope* user keeps running into the yellow, I'd say he's using the wrong program for the job."

Speedy and Flexible

To compensate for disk neglect, Garbers made it possible for *Infoscope* to use as much RAM as is in a PC. He feels that when using many programs, including *PMate*, his favorite editor, "you can be sitting in front of a system with 640K RAM, but when files get up to 64K you're told it's running out of memory. Hey, come on! People like to be able to use all the hardware they've got."

You don't have to tell *Infoscope* how much memory is available—the program finds the RAM and can use it all. Also, if your system has a printer, color monitor, mouse, or speech synthesizer, *Infoscope* automatically turns on features to match.

Garbers' intent, however, wasn't to make *Infoscope* a program that could do everything. "When people tried it out, some would ask, 'Why don't you put in this and that?' They'd want to add real heavy-duty relational database stuff—like JOIN operations.

"I'd reply that these features would be nice, but it would be like hanging fuzzy dice from the rear-view mirror of a Porsche. They wouldn't fit in with the rest of the design."

Now that Garbers has delivered *Infoscope* after 2 years of labor, he has discovered how true its finished design is to his initial goals. "On a flight to Fall COMDEX, about a year and a half ago, I wrote some notes on an envelope—just brainstorming ideas. I thought I lost the envelope, but it turned up recently, after we started shipping *Infoscope*. I was amazed at how many items on that envelope—natural language, focusing—had actually gotten into the program, even ideas that had notes next to them asking, 'Is this possible?'" For Garbers, it was. ■

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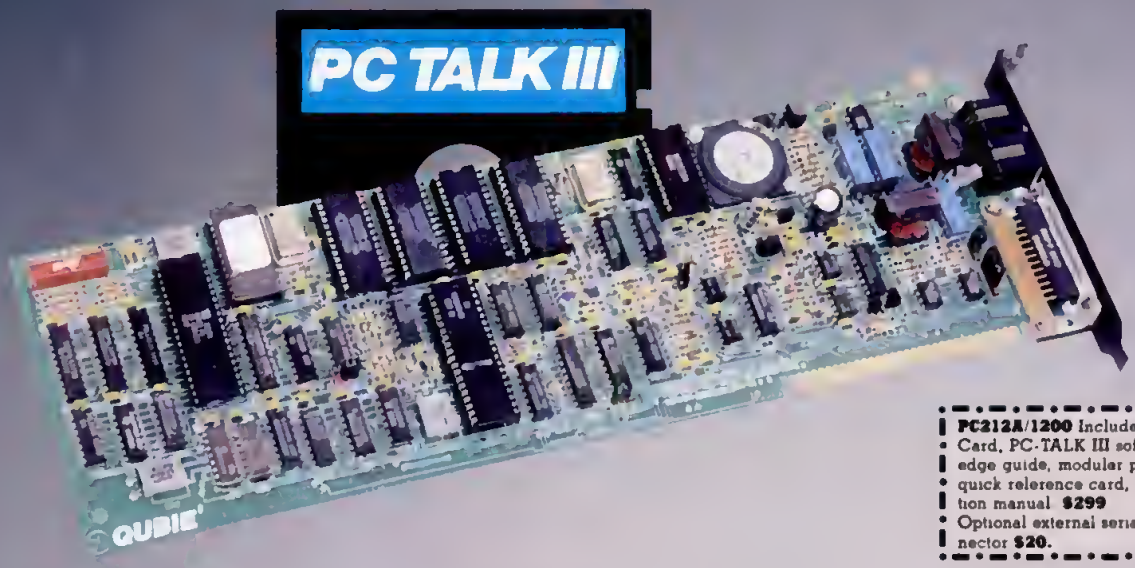
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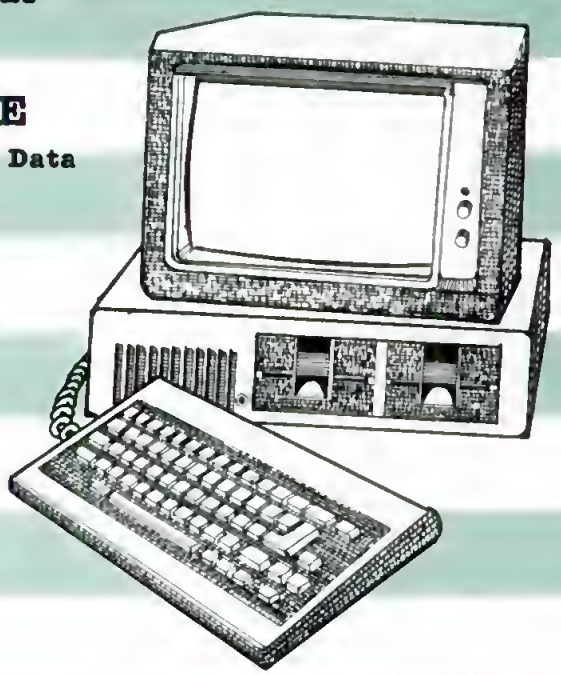
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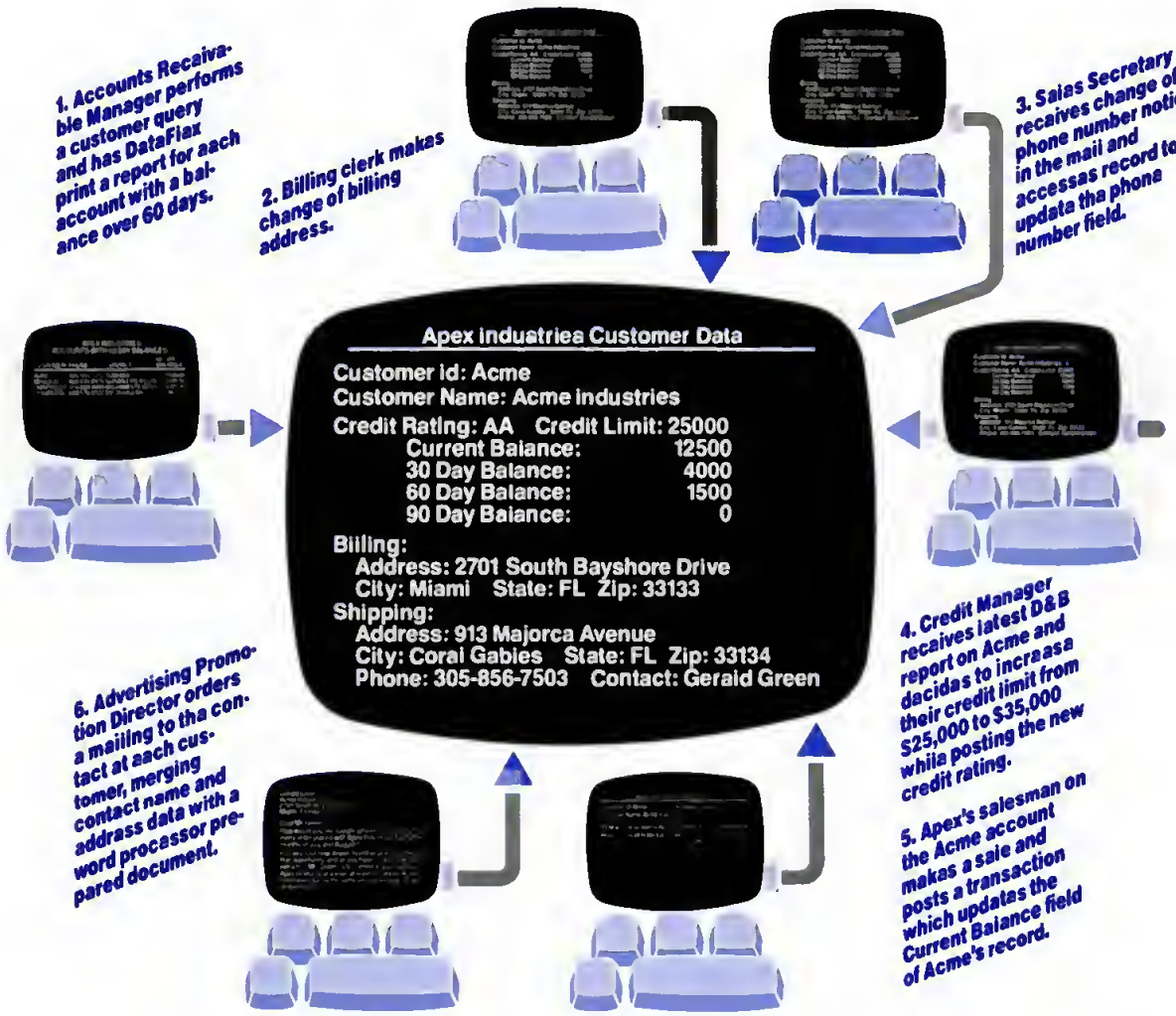
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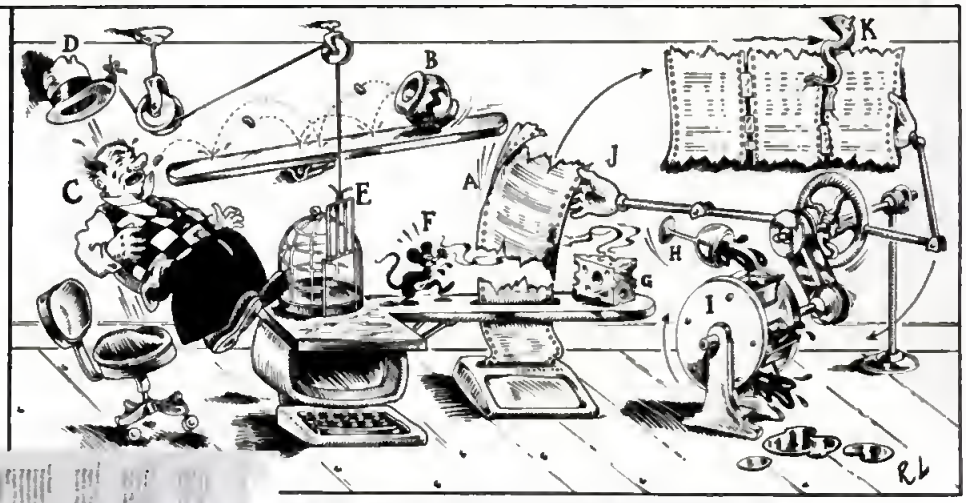
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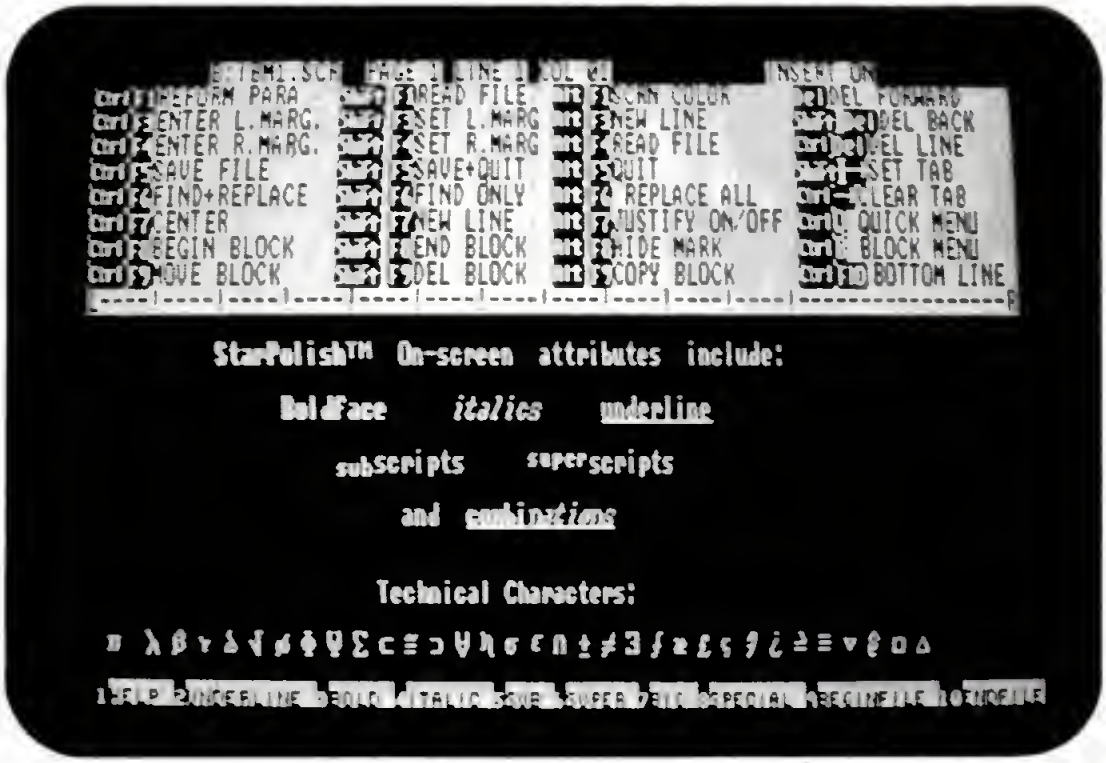
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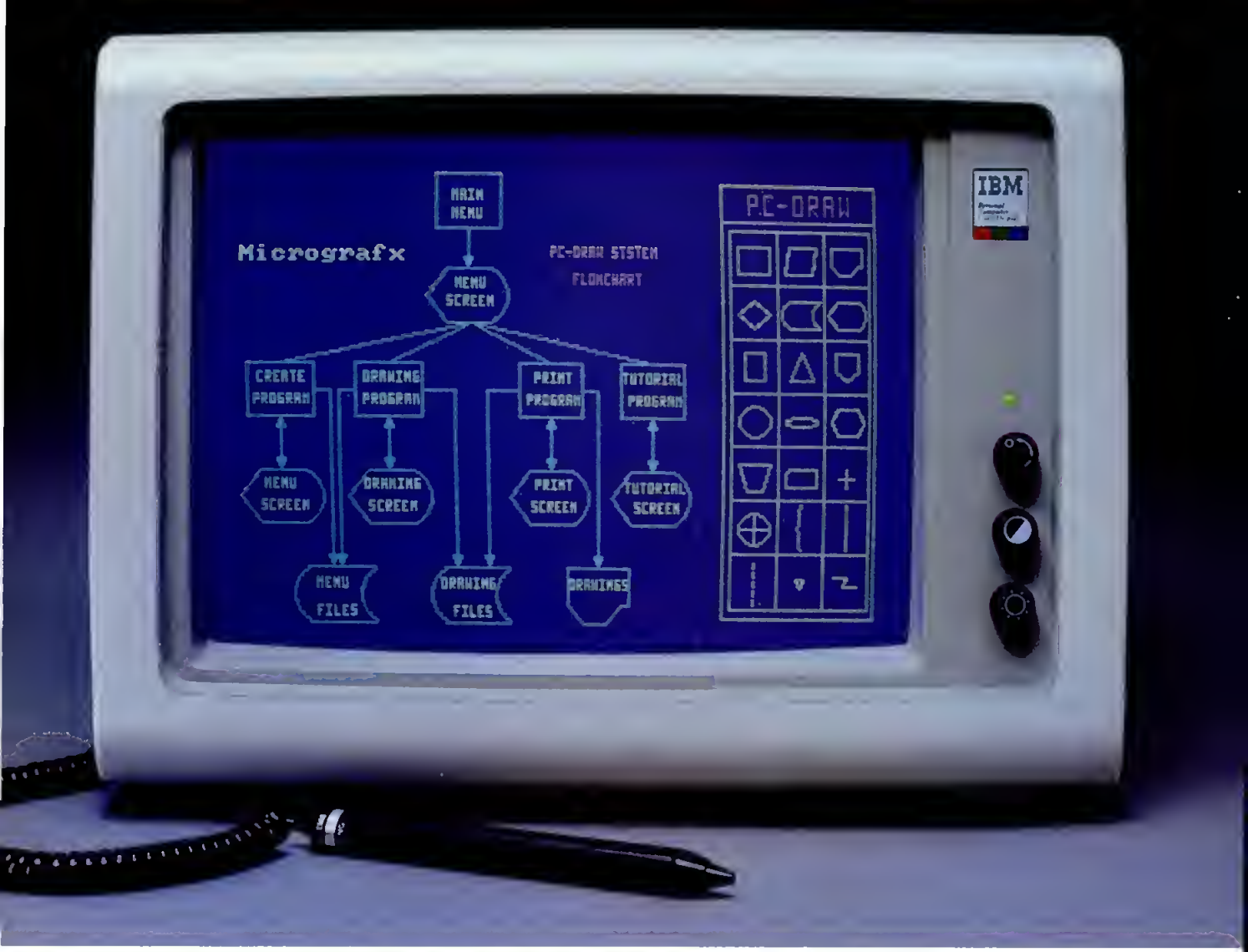
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Year of the Onion

The personal computer marketplace is certainly no vale of tears, but the lowly onion has its place. In this midyear report, Machrone finds a new ingredient in the software salad.

Here we are halfway into 1984. This was going to be the Year of the Mouse, remember? Or was it the Year of the Window?

It isn't either. It's the Year of the Onion. The onion is the perfect paradigm for integrated, multifunction software: It's layered, with only as much visible as you need at a given moment.

What happened to the mouse? Two things: Most of us couldn't find the requisite 100 square inches of available space on our desks, and the mouse was discovered to be a less-than-optimal pointing tool. Indeed, about the only program I can think of that really uses the mouse effectively is Microsoft's *Word*. The rest of the software on my machine doesn't even know the mouse is there.

I've had good experience with the Logitech mouse; I'm particularly fond of its ability to simulate the cursor commands from the keyboard. But I invariably end up using the back of a notepad for a rolling area, piling it on top of all the papers and junk on my desk.

Well, if not the mouse, what about that technological trendsetter, the window?

Visi On and *Windows* would have been forces to reckon with if they had come out in 1983. Both offer the advantage of a consistent interface, a fancy way of saying that all programs work the same or look the same from the computer's viewpoint. But both products only handle application programs written to their requirements. And they interpose a layer between you and the operating system—good for usability, bad for performance.



Bill Machrone

Some of the new packages that allow you to integrate your current software, such as *Desq*, may have a chance. The combination of convenience, familiarity, and simulation of multitasking is attractive. But hold the mice, hold the windows; I'll just take onions.

Onions Forever

A perfect example of onion software is Ashton-Tate's *Framework*. The outer skin is the outline manager, which organizes your work and controls access to the inner layers. The text editor and spreadsheet program coexist at the next level, with the graphics package just below.

Beneath it all, however, is a programming language. The casual or nontechnical user need never know it's there. The programmer can exult over it, calling upon virtually all of *Framework*'s capabilities.

This is the essence of onionness: Individual users see (and need to see) only as much as they are ready for. They can call on extreme handholding at the outset, with help menus and a simplified command set, but still receive sufficient functionality to make their efforts rewarding.

Onionness is not new: *WordStar* has had elements of it for years. When I used to train new personal computer customers, the calibrating question I asked was, "Which 40 percent of *WordStar*'s features do you need to learn?" I'd start them out at Help Level 3. Soon they were asking the questions that paved the way to the more advanced features.

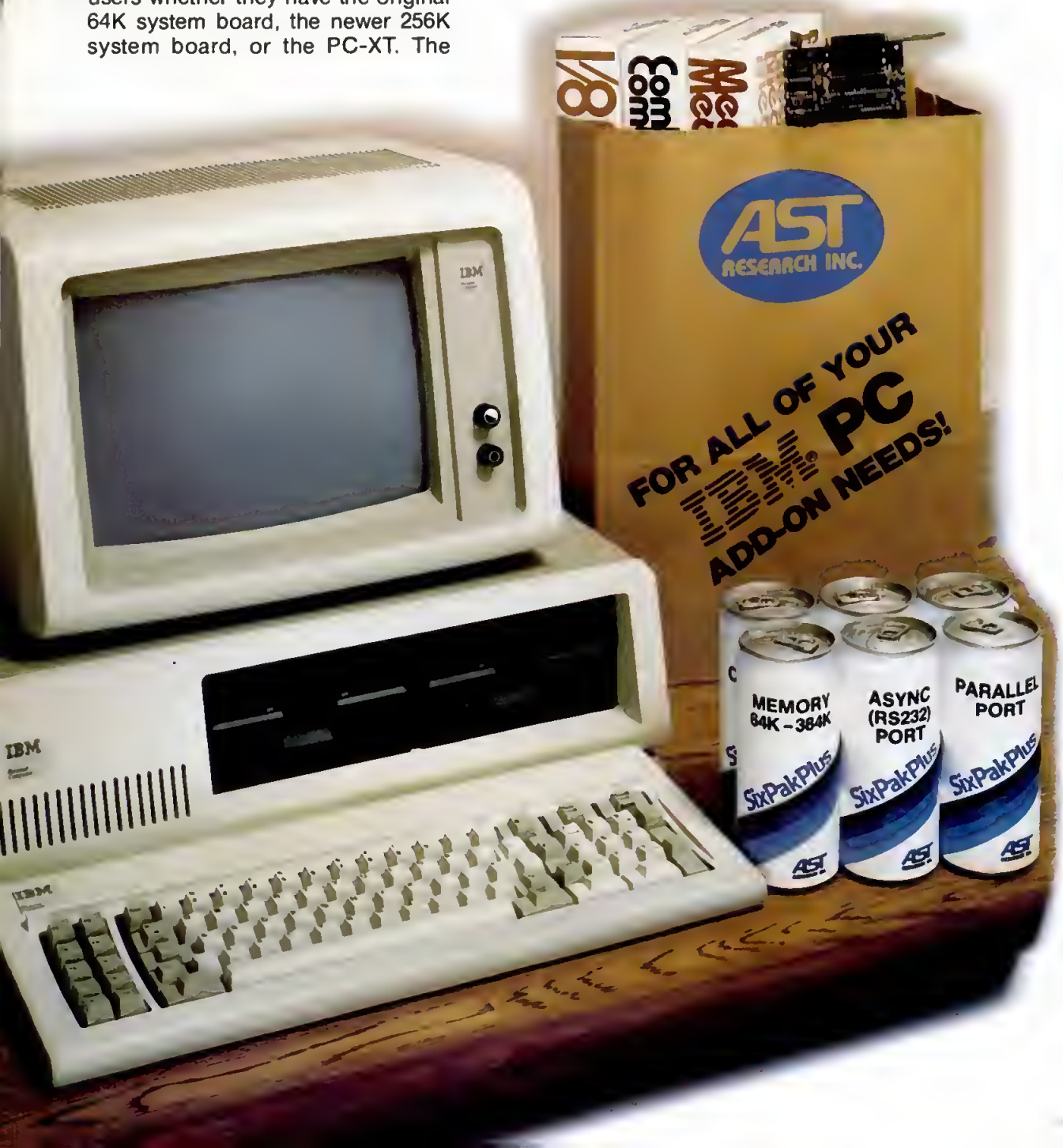
Another early onion is good old *dBASE II*. For each programmer who uses every documented feature (and a few that aren't) in its programming language, there are dozens of others who make do with CREATE, EDIT, LIST, and REPORT. Oh, they might learn to do a few SETs along the way, but nothing fancy.

(continued)

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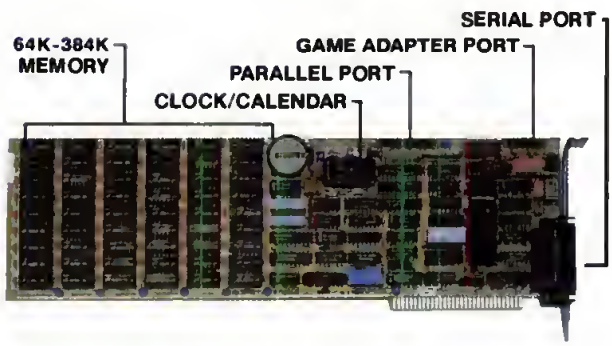
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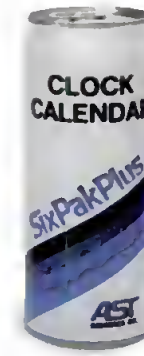




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Onions, of course, come in different flavors. Recently I taste-tested the new *Corporate MBA* and *Smart Set* integrated packages. In *MBA*, the transitions from one function to the next are so smooth as to be virtually undetectable. *Smart Set*, on the other hand, makes it perfectly clear that you've left the spreadsheet and are about to do some database management. But the functions all work the same way. In keeping with their onionness, both programs contain procedural languages that let you (or third-party developers) create tailored applications.

Another notable onion is MDBS's *Knowledge Manager*, colloquially known as *K-Man*. First conceived as a competitor to *dBASE II*, it has picked up a number of additional functions, not the least of which is a spreadsheet that's well integrated into the whole. Currently available modules, such as the graphics and screen-painting subsystems add a few more layers, and the onion will be complete with the addition of a rumored text editor and beginner-oriented front end.

Some users will never avail themselves of half the power of a package like *K-Man;* others will revel in its complexities. But each time they peel away another layer, they'll quietly thank the farsighted designers.

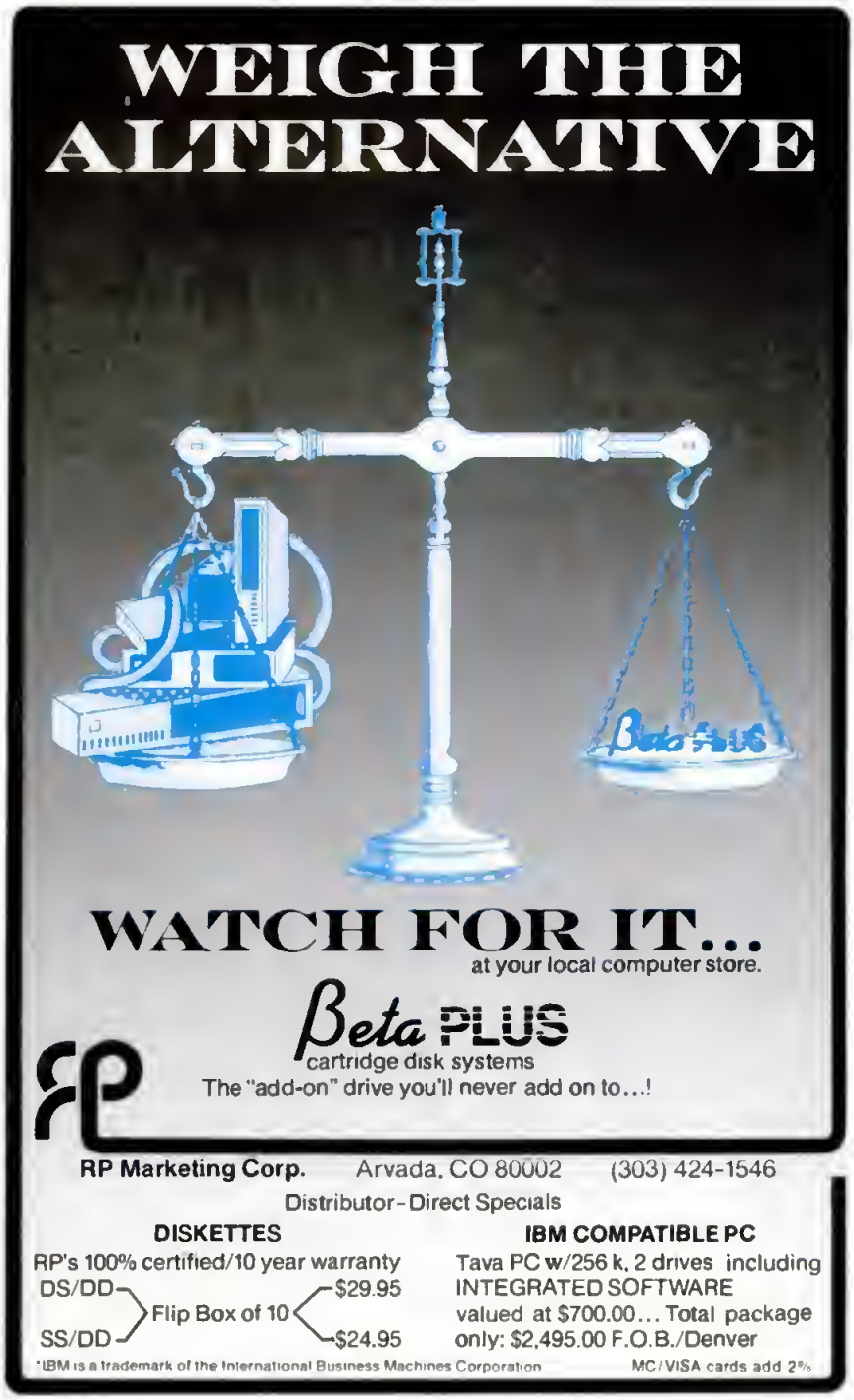
Is there such a thing as a perfect onion? Will software design evolve to the point that one package will do it all? Will every layer eventually be designed into the operating system?

Well, maybe. But that's not the way things have tended to work in this industry or any other. One example is the high end in programmable calculators. Texas Instruments' machines use algebraic entry, while Hewlett-Packard's use a reverse Polish entry system. Is there room in the market for both? You bet!

Hewlett-Packard's new 110 portable has *1-2-3* in ROM—a fine choice and a new high point in integration of hardware and software. But dyed-in-the-wool *Supercalc*' users wouldn't touch it with a 10-foot pole. And if *Framework* or *Symphony* is your choice, that's a lot of wasted ROM in your new machine.

Designers will continue to strive for the perfect onion. Buoyed by their success in 1984, more corporations will put serious money and talent into the effort.

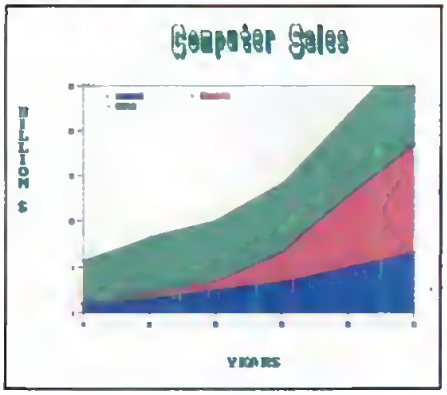
When they're done, you'll want to have it your way: with onions. ■



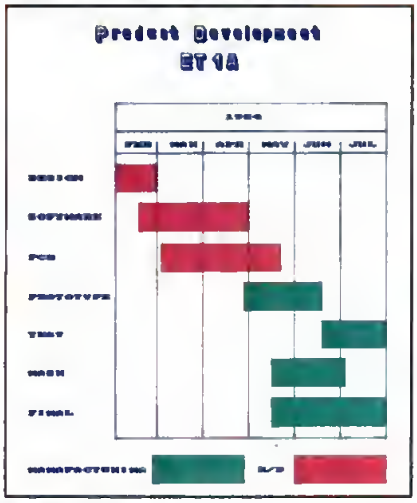
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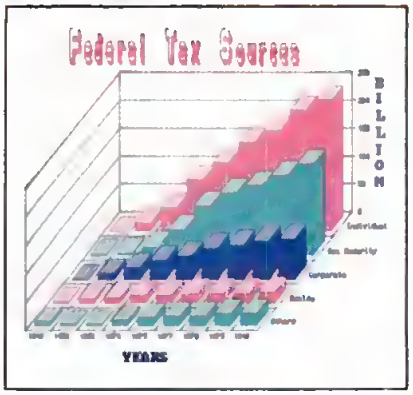
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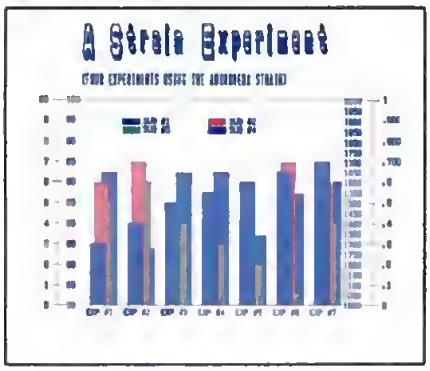
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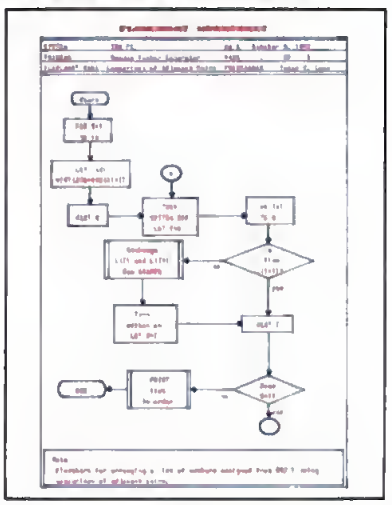
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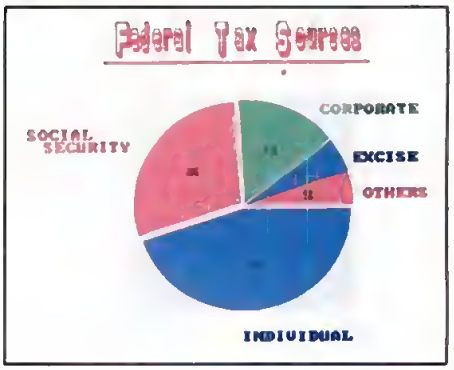
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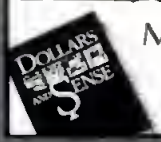
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CIRCLE 236 ON READER SERVICE CARD

It's Time for A Change in MIS

Corporate computer needs are changing, and MIS departments need to change with them—but how? Here are tips for MIS departments that want to evolve to meet the demands of 1984.

MIS departments need to change. It's becoming increasingly clear that the technological advances of the past few years have outpaced the MHS department's ability to absorb and respond to them.

As MIS departments first evolved, their structures and jobs were geared to support the highly centralized computing environment that existed at the time. But the industry has changed dramatically. Personal computers have been introduced, and as a result, the era of totally controlled central computing is gone; the power has shifted onto the desk of the end user.

The most common management information system response to personal computers has been to establish a person or small group to insure that micro users are acquiring acceptable hardware and to offer technical support.

Now, industry and technological changes require both philosophical and organizational shifts for MIS departments. Dedicated people in new job responsibilities are needed to support the new demands. Five basic steps can help to build the MIS department of the future:

• **Dedicate resources** for software evaluations and selection, management of retailers, and third-party developers and consultants. MIS departments must recognize that, with rare exceptions, they will be *buying* software and associated services. They will therefore need staff members to carry out ongoing evaluations and selections and manage software vendors, developers, and consultants.

• **Establish a vendor services area.** Success with vendors requires a staff that knows how to evaluate and select a vendor company. People who know how to prepare or negotiate vendor contracts are also necessary in the new MIS department.



Irene S. Nesbit

• **Develop and nurture a new breed of analyst.** Simply analyzing a company's user requirements is no longer sufficient. The analysis must include an evaluation of the technical options available. Analysts must blend leadership, imagination, corporate strategy, economics, and an understanding of the business problems to develop successful computing solutions.

• **Restructure and reorganize** the MIS job categories and salary structures to reflect the changes in the computing industry. These changes mean new jobs with new responsibilities. These roles should receive the status, pay, and career futures that will attract people with the right skills, talent, and experience.

• **Anticipate future user and corporate requirements.** MIS departments must begin to apply greater resources to micro users and to the integration of micros into the overall computing environment. The arena of end-user computing encompasses many activities—training, coordination, facilitation—all of which should be integral to the services MIS provides.

Most important, MIS departments must predict the future. A true distributed network combining PCs, supermicros, file servers, minis, and mainframes may be the corporate requirement of the future. Successful MIS departments must begin to understand and work on future corporate needs now.

MIS departments were once the agents of change for corporations. Today they need to implement changes in their own organizations. ■

Irene Nesbit is the president of Nesbit Systems, Inc. She analyzes and develops software for large companies.

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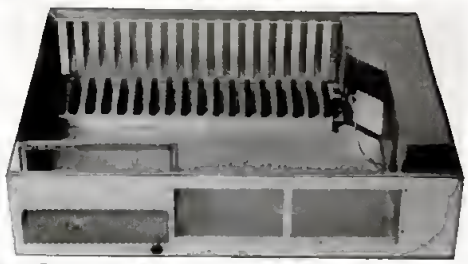
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Letters to PC

Clowning Around with Norton

Ever since 1981 when I purchased my IBM PC, I have seen scores of computer-related advertisements. There are little ones, big ones, ugly ones, appealing ones, and downright aggravating ones. But I must admit I have never come across anything as asinine as Peter Norton's ads.

The ads are the laughing stock of the town. He's the only person egotistical enough to insist that his picture accompany every ad or article he publishes. But there is no need for dismay; we have taken up a collection to buy Norton a new shirt and tie. The poor guy hasn't caught on yet that the "clown tie" look went out way back in the late sixties. I thought those people from southern California knew what was happening. I do, and I'm from Indiana.

However, I do think he's a fine author. He catches some flack now and then, and maybe rightfully so. I'm not sure what's more fun, waiting for a new release of DOS or waiting for Norton to print an article (complete with a picture of him wearing clown tie) about how bad the new version is.

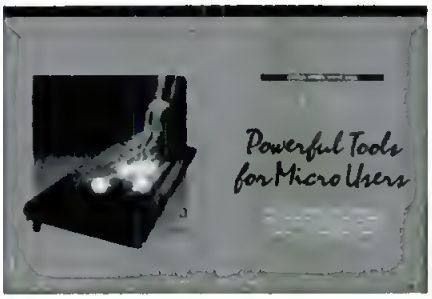
But tell him to keep it up. We really do support him. But that picture . . . .

Greg Baxter
Lafayette, Indiana

Peter Norton replies:
For the ad photo, my wife insisted that I take off the rubber nose and frizzy wig that I normally wear around the office, but I still wore my clown tie. For me, it's a badge of honor.

Macro Facilities

Although we were pleased to see Steve Sall's article, "Macros: Powerful Tools from Micro Users" (*PC*, Volume 3 Number 8), the article did not emphasize that there are two very different types of macro facilities. On the one hand, there are the keystroke-capturing products, such as *ProKey*, that can be used in all application programs. These products are extremely



useful and are simple to use because they add very few commands of their own. Your definitions are basically limited to a sequence of keystrokes in whatever application program you're using.

At the opposite extreme, the most powerful macro facilities are found in *PMATE*-based products such as Landmark Software's *XERGO*, a word processing environment that can use the full *PMATE* macro language. In addition to user variables and arithmetic operations, the macro language provides system variables that indicate what ASCII character, what column, and what line number the cursor is on. It also provides "if-then-else" and looping structures. This type of facility can be used to build specialized commands customized to the user's particular application: automated text manipulation, file conversion utilities, and file analysis routines. This is far beyond what can be done with just a keyboard-capturing product.

Neither type of macro facility eliminates the need for the other. A word processing environment, like *XERGO*, that includes a full macro language facility, can be used very nicely in conjunction with a keystroke-capturing product like *ProKey*. Together you have the best of both worlds and can use whichever macro facility is most appropriate in each instance.

Robert E. Brown
Landmark Software
Sunnyvale, California

Has Osborne Miscalculated?

Adam Osborne's guest editorial, "An Adolescent in Disguise" presents some "facts" that just aren't true (*PC*, Volume 3 Number 9). First, he asserts that "Lotus has been shipping between 7,000 and 12,000 packages of *1-2-3* per month." According to my calculations, if Lotus bypasses distribution and delivers *1-2-3* to the retail chains directly, then they clear $250 on each $495 list price package (we have seen *1-2-3* sold for as little as $299). Since Lotus just sold $28,269,000 in the first quarter of 1984, and since Lotus was still a one-product company at that time, then they sold at least 113,000 *1-2-3* packages, right? If they went through distribution and got less than $250 per copy of *1-2-3*, their sales would be even higher. 113,000 over 3 months is more than 37,000 a month—where in the world did Osborne come up with 7,000–12,000 a month?

The entire point of Osborne's argument, that Lotus is not selling nearly as many software packages as it should, is exactly wrong. Lotus has, in fact, saturated the market!

Hal W. Hardenbergh
Santa Ana, California

Reducing Interference

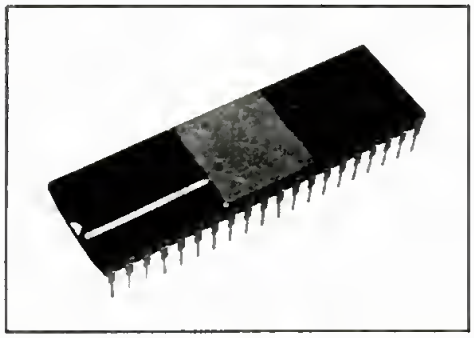
I read Maurice E. White's letter regarding interference with great interest (*PC*, Volume 3 Number 10, page 93). We use a PC in our business, which is electromagnetic interference testing. Our own PC is located near several sensitive pieces of elec-

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tronic equipment. We have managed to reduce the interference from the PC to acceptable levels after investigating several factors: the emissions conducted back onto the AC power line, the radiated emissions, and the susceptibility of the equipment being tested to interference.

I would not expect White or the average PC user to go the extent that we have. However, the Federal Communications Commission (FCC) offers limited protection to the PC user by regulating the first two areas mentioned above. Every PC bears a label attesting to the fact that it conforms to FCC regulations. The problem is that many PC users unknowingly create interference. Aside from the cabinet screws being too tight, the prime offender that we continually find in all sorts of electronic equipment is unshielded cable, external to the equipment. A low-cost, easy fix is aluminum foil. Wrap the foil around the cable, especially any plastic connectors, and ground only one end of the foil (preferably the end that goes to the PC). If this reduces the interference, you will probably obtain even better results through the use of shielded cable or zip-on Zippertubing.

We have some other suggestions and tricks we'd like to share with your readers. They are as follows:

1. Try different length interface cables—one of your cables may be a perfect radiator of a particular harmonic.

2. Move the cables, the PC, or the equipment being interfered with around, and hopefully this will reduce interference.

3. Remove boards from the expansion slots one at a time to find out if one of them is a major source of interference. If you do find an offending board, contact the manufacturer. Ask for help, and if you get the brush-off, inform the manufacturer that the board coupled with the PC must comply with FCC rule Part 15. A final resort is to file a complaint of suspected violation with the FCC. (The complaint can be directed to any FCC field office or to the FCC Office of Science and Technology located in Columbia, Maryland.)

4. Plug the PC into a different AC outlet, preferably one on a different fuse or circuit breaker than the equipment being interfered with.

5. Install a filter to further block emissions conducted back onto the AC power lines. IBM uses one to meet FCC limits, but a second one will further reduce these emissions.

Howard Epstein
Atkinson, New Hampshire

Software Flaw

I read with great interest the Price Waterhouse review of Information Unlimited



Software's (IUS) *EasyBusiness Systems* accounting software packages ("Six Easy Pieces: Accounting Packages from IUS," *PC*, Volume 3 Number 8). We use the entire series in our own operation and have installed it in several of our clients' businesses.

IUS has an excellent series, with one exception. *Payroll* falls flat on its face in the most important area to any employer: government reports. It has none.

You can imagine both our surprise and our clients' surprise when, after months of satisfactory performance, they went to print quarterly reports and found none. A call to IUS confirmed that they were aware of this serious drawback, and we were told that an update was being contemplated for future releases.

Unfortunately, this is no help for those of us who are now forced to use the adding machine to correlate that data for state and federal reports on several hundred employees.

Until this problem is fixed we are recommending that our clients shelve IUS' *Payroll*. For all its excellent bells and whistles, documentation, and support, the lack of consolidated reports makes it worthless. Virtually all the time saved with this otherwise superior package is now wasted because users must transcribe figures from their adding machine tape to the appropriate forms.

Chris M. Kinsey
Anaheim, California

It's Supercomputer!

Congratulations on an excellent Volume 3 Number 9 issue of *PC*. The idea of comparing the PC and a supercomputer was both novel and useful.

There is, however, the danger that numeric ratios could be misinterpreted. A Cray-1 does not equal 1,000 PCs, though the prices and CPU speeds appear to approximate that ratio. The supercomputer is used to do entirely different tasks than those appropriate to a PC.

Nevertheless, I think the articles contrasting the PC and supercomputers were interesting, informative, and entertaining. Keep up the good work.

David McManigal
Stormville, New York

You're right, the ratio is not exact. Most companies we know would much rather have access to a thousand IBM PCs than to a single Cray-1 supercomputer!—Ed.

BASIC Comments

"Making BASIC Mind its Millionths" (*PC*, Volume 3 Number 7, page 39) gives readers the wrong advice. While you're right that the CINT function rounds a floating-point number to the nearest integer, CINT also converts the number to an integer in the process. As a result, you get an overflow error whenever you use CINT on a number exceeding positive or negative 32767. This limit makes CINT useless for general financial calculations; FIX and INT do not have this restriction.

Truncation errors crop up in any language that uses binary format for internal



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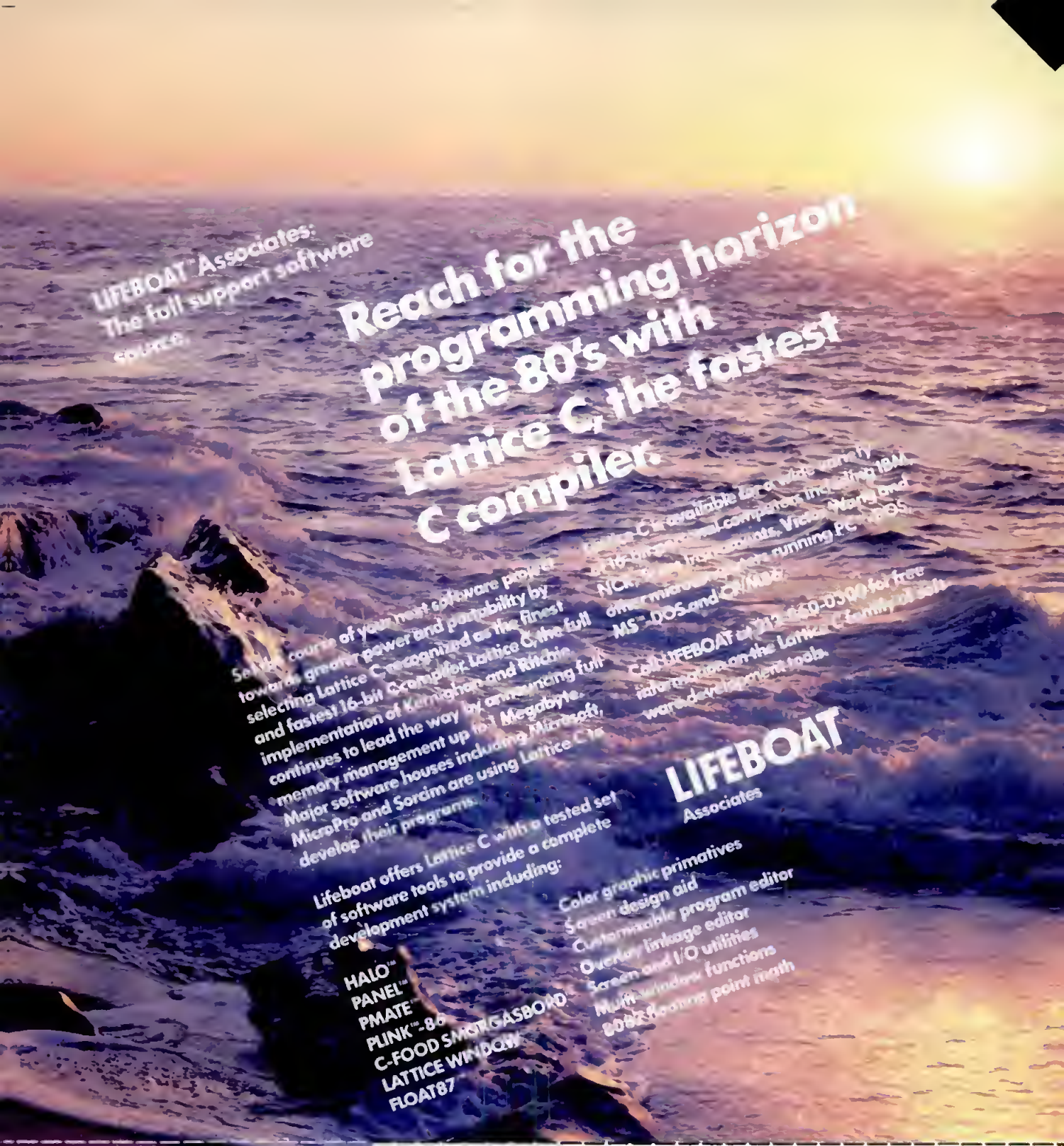
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representation of decimal numbers. To correct these errors, you must write special rounding routines. The following function, for example, can be used in a financial application to round a double-precision number to the nearest cent:

```
DEF FNR# (X#)=FIX
(X#*100#+ [SGN (X#)*.5#])/
100#
```

The SGN function (in square brackets) has the effect of rounding positive numbers up and negative numbers down if the least-significant-digit is large enough. This correction makes the rounded result of FNR#(−3.759) be −3.76 instead of the less accurate −3.75.

A bug in ROM BASIC in some early PCs causes INT and FIX to work incorrectly; the functions yield −1 when the double-precision argument is zero. IBM fixed this quietly in later models.

Microsoft's Business BASIC deals with the truncation error problem by storing numbers in binary-coded-decimal (BCD) form. The truncation errors that occur in Business BASIC are the same ones you'd expect in decimal arithmetic, such as ⅓ being truncated to .33333...33.

This BASIC compiler runs on the IBM PC, but its functions are limited to those in an earlier Microsoft BASIC, Version 5.x. Business BASIC has no PC-specific functions, such as graphics, and screen-related operations (including cursor addressing and screen clearing) must be handled by PC-DOS 2.0's ANSI.SYS facility.

Burks A. Smith
Shawnee Mission, Kansas

Airport X-ray Damage

This letter responds to your request for experiences with X-ray machines in airports (*PC*, Volume 3 Number 7, page 79).

I recently flew to Chattanooga and Atlanta to promote our company's product, *Clientfile* (a client management program for insurance agencies). The first demonstration was in Chattanooga. After we passed through the main menu to the

search function, which uses a file indexed on last names, I began to experience problems. The program refused to find any of the names that I knew were stored. Luckily, my prospect had a serious telephone call at that moment, and it gave me the opportunity to use a sector-viewing utility to see what the problem was.

Behold! Random spots were missing, not merely garbled. Upon checking the two backup disks I had brought with me just in case, I found the same to be true, although in different sectors. By divine providence, I was able to reassemble every thing from the three disks and have my program working by the time my potential client retumed.

As a precaution, when I traveled to Atlanta, I placed my new disk in the suitcase that I checked (not to my carry-on luggage). That diskette was undamaged.

I could only assume that the damage that occurred the first time was a result of subjection to something similar to a magnetic field when I was carrying the disks with me. I had removed the diskette case from my suitcase, carried it around the detection devices, and opened it calmly for the attendant. I assume that this was the place that the damage occurred, not from direct contact, but from a random strike by a magnetic field that must have been 15 feet from the X-ray machine.

Stephen P. Goodman
Glen Rock, New Jersey

Corrections:

The following product information was omitted from "A Trio of Mailing List Managers," (*PC*, Volume 3 Number 9).

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Alphanetics Software
P.O. Box 339
Forestville, CA 95436
(707) 887-7237, (800) 321-5346
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Requires: 64K RAM, 80-column printer.

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(continued)

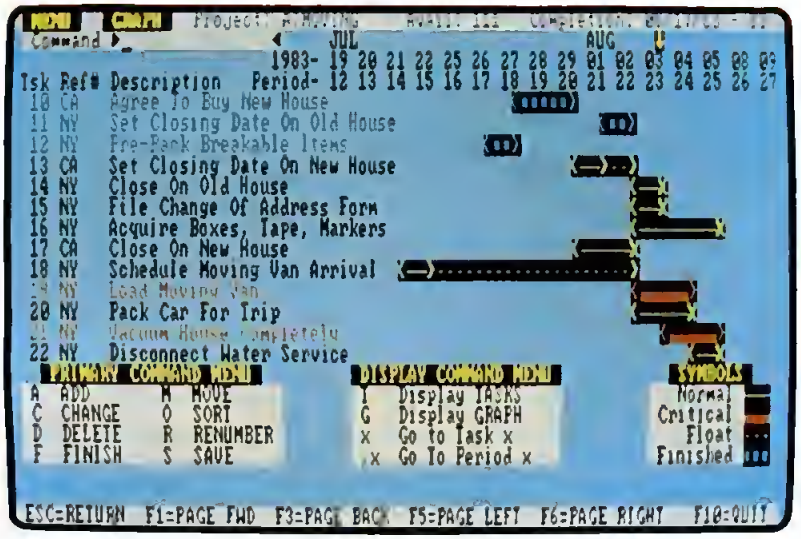


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Requires: 129K RAM, two disk drives (IBM PC) or a PC-XT.

CIRCLE 749 ON READER SERVICE CARD

Mixed up about "Mixing Monitors" in PC Tutor (*PC*, Volume 3 Number 11, page 442)? So were we. The dropped copy will appear in Volume 3 Number 15.

Two numbers were inadvertently switched in the phone number given for IdeaWare ("Creating Order From Chaos," *PC*, Volume 3 Number 9, page 326). The correct number of the company is (212) 334-8043. IdeaWare also has a toll-free number, which is (800) 221-7798.

KEY Software, Inc., the manufacturer of *ResQ* (one of the database management systems reviewed in "Project Database," *PC*, Volume 3 Number 11), has changed its address. It is now located at 1000 Skokie Blvd., Suite 200, Wilmette, IL 60091 (312) 256-6776.

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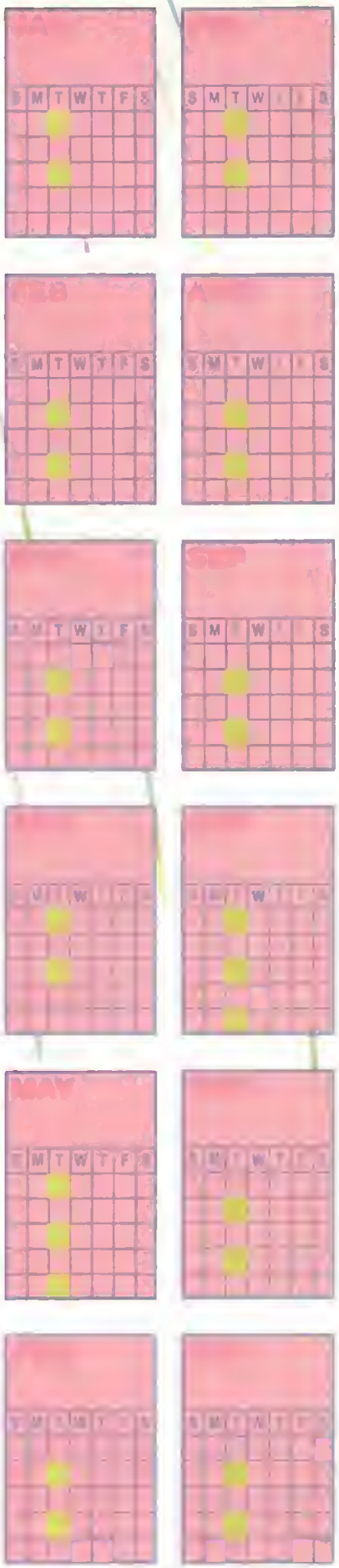
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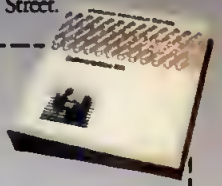


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When DOS Is Not Enough

Not all the programs that run on DOS will run on all the computers that use DOS. There are many reasons for this, and the situation is not likely to change in the near future.

I recently came across a poignant headline: "Why won't all that IBM PC software run on my Z-100?" It was on the cover of *Sextant*, a user's magazine for the Heath/Zenith computers, including the Z-100. The headline introduced an excellent technical explanation of why the Z-100 isn't PC compatible, but the technical information wasn't what moved me. Instead, I was touched by the sad and wistful undercurrent, what you might call PC envy.

Imagine how Z-100 owners must feel. The IBM community has the tastiest and most luxurious software library in the world. The *1-2-3*s and *Word*s are created for the PC first; other machines come second—if at all. Most of that tasty software says, "requires DOS," and Z-100 users look at it and say, "Oh, wonderful; our computers use DOS, so this software should run." Well, this is a case of wishful thinking. These users would like to think that a "DOS program" is DOS generic, but the sad fact is that there are virtually no DOS-generic programs. IBM PC programs are, almost without exception, PC-specific.

Software Services

The DOS and the ROM BIOS service programs that are built into every PC provide a framework of services that programs can use to perform common tasks on the computer. There are a variety of places that a program can turn to for these services. It can ask the operating system, DOS, to perform the task, it can work through the BIOS, or it can work directly with the hardware.



Peter Norton

DOS provides the highest, most portable level of services. With few exceptions, if a program uses DOS services, they will work, unaltered, on any DOS computer.

If DOS provides the highest level of services, the PC's built-in ROM BIOS services fall into the middle. Programs that use the BIOS services are tied to the IBM PC design, but they should be completely model-independent.

The lowest level is to bypass both DOS and the ROM BIOS and work directly with the hardware. This method is used more often than you might expect.

Why don't all programs work exclusively with the DOS services? There are three reasons, one understandable and two quite stupid.

The understandable reason is performance. Each layer of service adds some overhead and usually a loss of speed. For some operations, this disadvantage doesn't matter—either the high-level services are reasonably fast, or the operation isn't performed often enough to matter.

The first stupid reason is simply that the programmers who wrote the DOS services weren't smart enough to see the important advantages of using them. These are the oafs who gave us programs that worked under DOS 1.0, but not under 1.1, and so forth.

The other stupid reason why programs aren't DOS-generic is that DOS was not designed to provide the services that they need, forcing the programs to work on a lower level.

Typical programs need to have a variety of services performed for them. DOS provides a workable set of services for disk operations, and keyboard operations are also well supported, especially considering the special problems of keyboards. When it comes to screen services, though, DOS leaves us in the lurch.

The only screen services that DOS provides are primitive "tty" (or teletype) ser-

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CIRCLE 184 ON READER SERVICE CARD

vices that treat the display screen as if it were a printer or teletype. Few important programs can get by with that alone. In fact, most programs have their most demanding requirements for services exactly where DOS is weakest: in full-screen output operations.

Typical Approaches

I want to discuss what typical PC programs do, and which level of services they usually use.

Programs take a great variety of approaches to controlling and using the PC, but some factors are quite common. For disk operations—finding files, reading and writing data, loading program overlays, and so forth—most popular programs rely entirely on DOS. A few programs, notorious for scrambling disks, don't use DOS, and try to take care of decoding disk formats themselves.

Keyboard operation services vary a bit more. While DOS provides quite adequate keyboard services, many programs go directly to the PC's ROM BIOS for keyboard input—completely unnecessarily, in my view. It's easy to test whether the program you use does this. If it responds to the redirection of input available in DOS 2.x (the <INPUT business, where the program gets its input keystrokes from the file instead of from the keyboard), then it uses DOS to get its keyboard input; if it doesn't respond, you know it bypasses DOS.

DOS provides no full-screen output services, leaving the choice of either the ROM BIOS services or working directly with the hardware. It turns out that the ROM BIOS provides a rich and powerful set of services, so that programs could theoretically rely entirely on them to create their screen output. However, it's somewhat rare for a program to do this. Instead, programs typically use the BIOS to move the cursor around, but create screen displays by working directly with the hardware. There's a simple reason for doing things this way: It's incredibly quick and efficient.

DOS Can Do It

It is possible to generate full-screen output with DOS, thanks to the ANSI device driver, which was introduced with DOS 2.0. The ANSI driver is optional on PC-DOS (it's there, and it will work if you take the trouble to activate it with DOS' CONFIG.SYS start-up option).

The ANSI driver is a complex and fascinating tool, and it provides two key facilities. One is the ability to redefine the meaning of key strokes (a very crude version of *ProKey*); the other is the ability to do full-screen output, with such functions as moving the cursor, clearing the screen, and changing the display color.

Unfortunately, while the ANSI driver can rescue programs that want to do screen output in a DOS-generic way, it's not a final solution. Essentially, the ANSI driver works interpretively, which means that its performance is relatively slow. Its facilities are wonderful, and the DOS world has good reason to be grateful for the existence of a generic screen driver, but it's not adequate for heavy, fast-running use. That's why Microsoft doesn't use it.

I am incredibly impressed with what Microsoft has done to make its own software, such as *Multiplan*, run on a variety of computers. Its full-screen software, such as *Word* and *Multiplan*, comes with an "Install" program that jams the appropriate screen driver into the application program. The list of drivers that can be installed into *Multiplan* is impressive—including both a long list of machine-specific drivers and a number of generic ones that work for standard terminals and display screens.

As far as I know, Microsoft keeps this installable screen driver to itself, giving their products a terrific competitive advantage. If Microsoft would sell it to other software developers, though, a huge amount of software would become available for just about any DOS computer. That would be a great leap forward for both DOS and the entire micro industry. The way things stand now, IBM's hammerlock on personal computer sales is self-perpetuating, because the best software is written for the PC first and only sometimes translated to other machines later.

If someone would create a commercial set of screen drivers with the strength and flexibility of Microsoft's, they could probably get rich licensing it to software vendors, while at the same time loosening the chains binding the industry to IBM. If the non-IBM micro makers had any sense, they would get together and fund an independent effort to create such a set of driver software, and then give it away. But that's a pipe dream.

The Small Fry

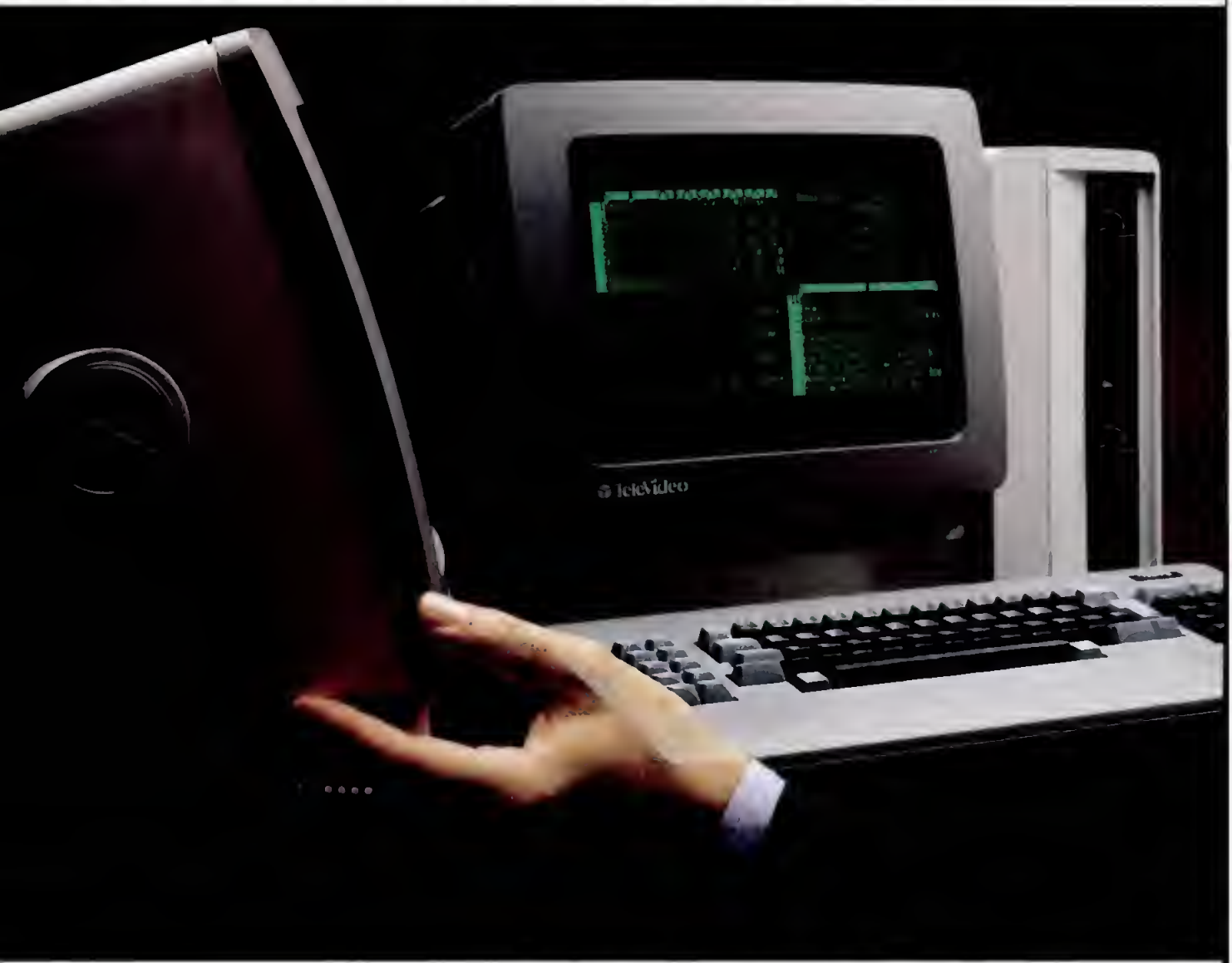
That leaves the small fry of the software world with an interesting problem. While the Lotuses and Microsofts can afford to port their programs to any computer they find worthwhile, the little guys just don't have the resources to do that. That's why we don't see many IBM PC programs, beyond the top tier, being converted to machines like the Zenith Z-100.

My experience is probably typical. I'm currently working on the next major version of my *Norton Utilities*. To the greatest degree possible, I'm trying to make it work on any DOS computer. My approach is, if a manufacturer will lend me a machine, I'll port my software to it. But you'd be amazed at how many personal computer makers won't give me the time of day. I guess they believe that they can sell their machines without any software. (And you wondered why so many computer makers are going out of business.)

Now, my software business is small potatoes compared with Microsoft or Lotus or Ashton-Tate, but I am one of the most prominent and visible of the hoards of small software outfits. If I'm getting the cold shoulder from hardware makers, imagine what's happening to everyone else!

And that, Virginia, is why all that PC software won't run on your Z-100. ■

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Communication Port	YES	OPTIONAL	YES	YES
MS™-DOS/BASIC®	YES	OPTIONAL	YES	OPTIONAL
System Expansion Slot	YES	YES	YES	YES
RGB and Video Port	YES	OPTIONAL	YES	OPTIONAL
Typical System Price	**$2995**	**$3843**	**$4995**	**$5754**

compatibles. the best software.

and has the standard—not optional—features you need to take full advantage of every job your software can do.

Study the chart at the left. It proves that TeleVideo—not IBM—offers the best hardware for the best price.

Note that TeleVideo's ergonomic superiority over IBM extends from fully sculpted keys and a comfortable palm rest to a 14-inch, no glare screen that tilts at a touch.

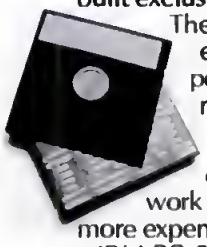


THE BEST PORTABLE FOR THE BEST PRICE.

Features	TPC II	COMPAQ
High Capacity Storage	YES	NO
2nd Disk Drive	YES	OPTIONAL
Quiet Operation (No Fan)	YES	NO
Ergonomic Display	YES	NO
Communication Port	YES	OPTIONAL
International Power Supply	YES	NO
MS™-DOS 2.11	YES	NO
Graphics Display	YES	YES
Typical System Price	**$2995**	**$3710**

THE BEST MICROCHIPS.

What is perhaps most impressive about the TeleVideo IBM PC Compatible can be found deep within its circuitry. We use the same 8088 central processing unit that runs an IBM PC. But we also employ new VLSI (Very Large Scale Integration) microchips that are designed and built exclusively for TeleVideo. These interface more efficiently with the powerful 8088 and yield numerous benefits.



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Fewer circuit boards to cool also allowed us to eliminate the noisy, irritating fan IBM and most other PCs force you to put up with. And TeleVideo compatibles accept any IBM hardware options without modification.

THE BEST LINE.

But the Tele-PC is only one element of the TeleVideo IBM PC Compatible line.

The TeleVideo XT is the best hardware for users of popular IBM XT software who would appreciate an extra 10 megabytes of storage capacity along with the advantages listed on the preceding chart.

As the chart above demonstrates, our portable IBM compatible computer, the TPC II, is far and away better hardware than COMPAQ.™ Better hardware—standard—at a better price.

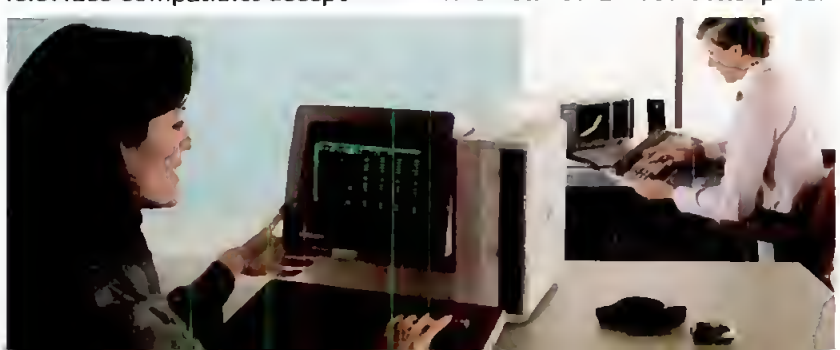
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The TeleVideo IBM PC Compatible line is made by the world leader in multi-user computer systems and the number one independent manufacturer of terminals.

Our compatibles are available at participating ComputerLand and Entré (call 800-HI-ENTRE) dealers or you may call 800-538-8725 for the dealer nearest you. In California, call 800-345-8008.

Before you invest, make a few simple comparisons. You'll find that TeleVideo—not IBM or COMPAQ—has the best hardware for the best software. At the best price.

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$329 Includes:	Options:	
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AST SuperPak Software & Q Quick Menu	GamePak	$40
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I/O Plus II™		
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Clock calendar with battery back up	Game Port	$35
Asynchronous communications port (RS232C serial, COM1 or 2)	Printer Port	$35
AST SuperPak Software & Q Quick Menu One year Parts & Labor warranty	2nd Async Port	$35

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$329 Includes:	Options:	
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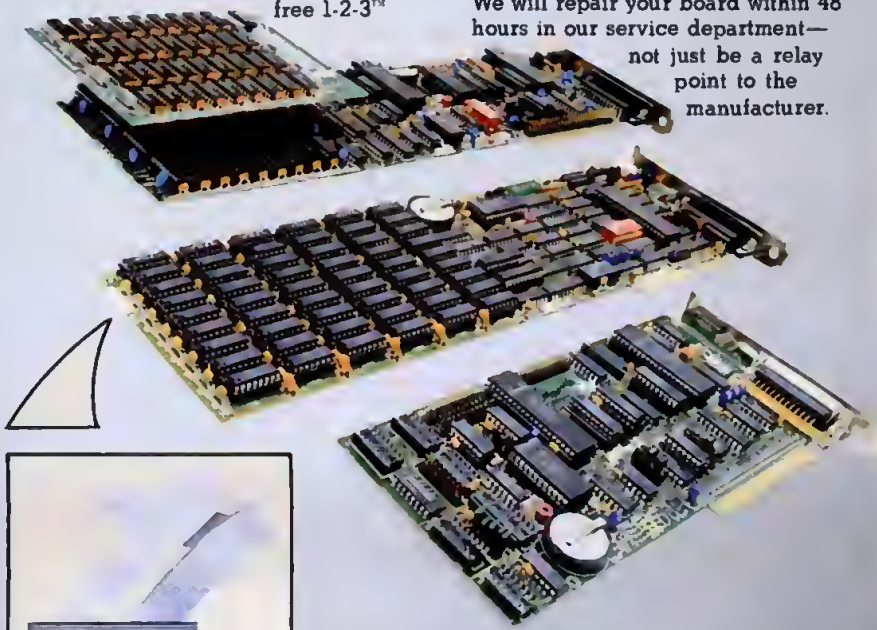
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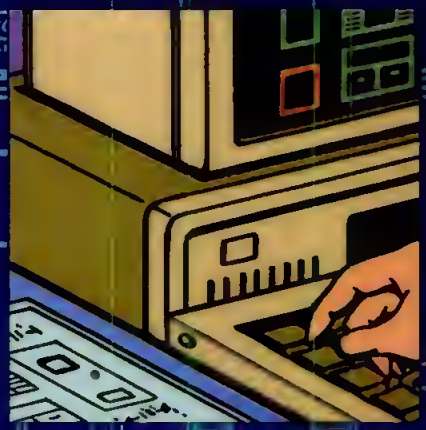
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Getting the Picture with CAD

For years, computer-aided design has speeded drafting work for engineers, architects, and designers. Now CAD programs have made the move from minis to micros.

Illustrations: Brad Hammond

GETTING THE PICTURE

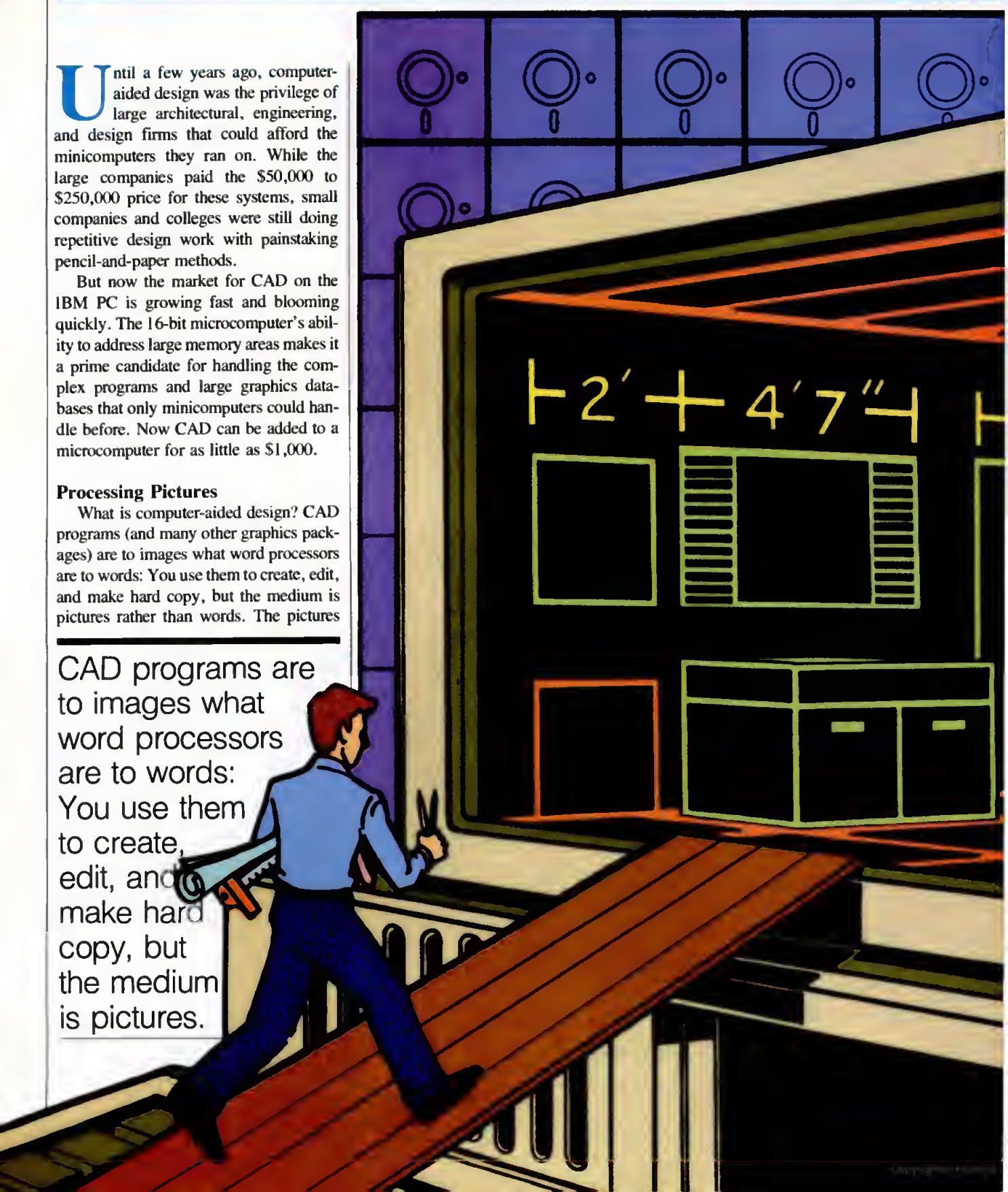
Until a few years ago, computer-aided design was the privilege of large architectural, engineering, and design firms that could afford the minicomputers they ran on. While the large companies paid the $50,000 to $250,000 price for these systems, small companies and colleges were still doing repetitive design work with painstaking pencil-and-paper methods.

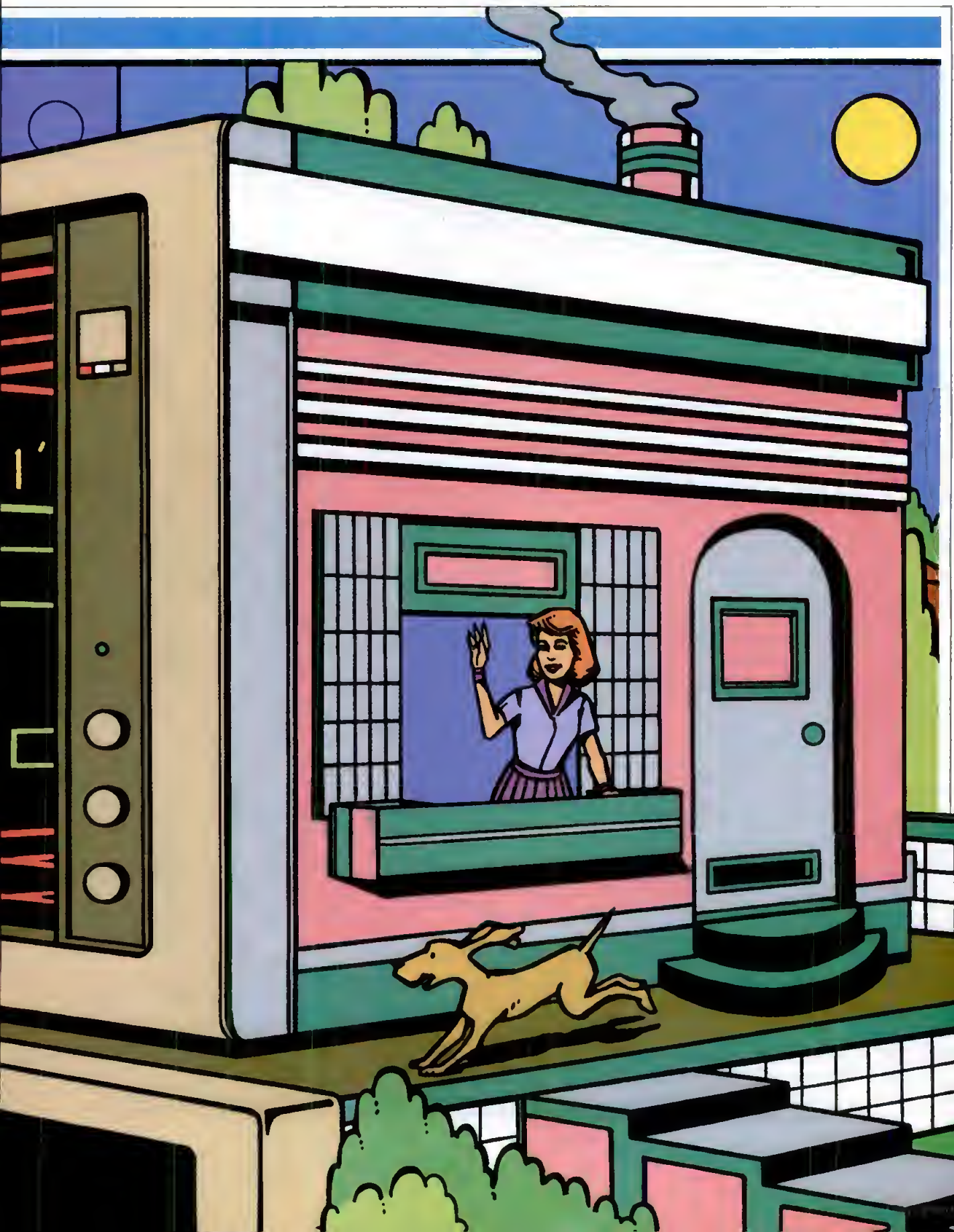
But now the market for CAD on the IBM PC is growing fast and blooming quickly. The 16-bit microcomputer's ability to address large memory areas makes it a prime candidate for handling the complex programs and large graphics databases that only minicomputers could handle before. Now CAD can be added to a microcomputer for as little as $1,000.

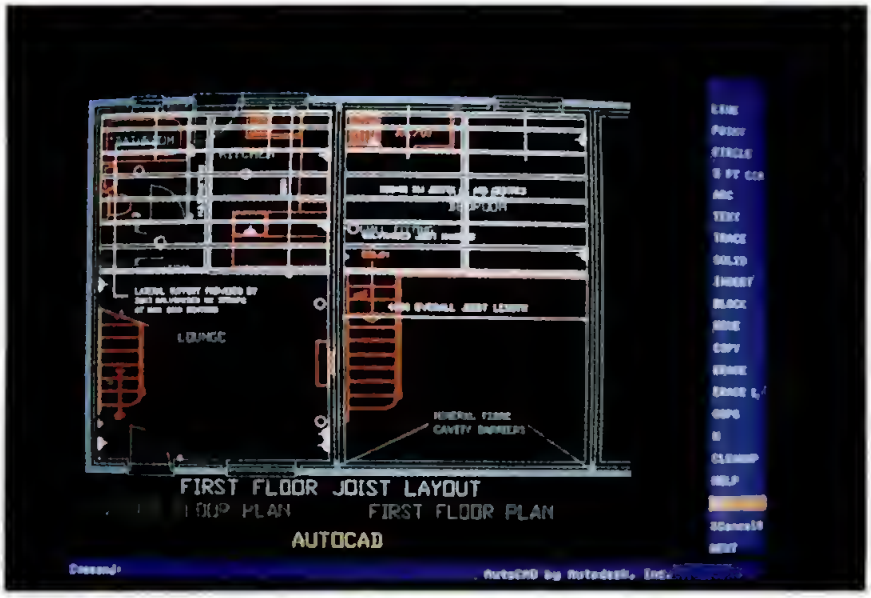
Processing Pictures

What is computer-aided design? CAD programs (and many other graphics packages) are to images what word processors are to words: You use them to create, edit, and make hard copy, but the medium is pictures. The pictures

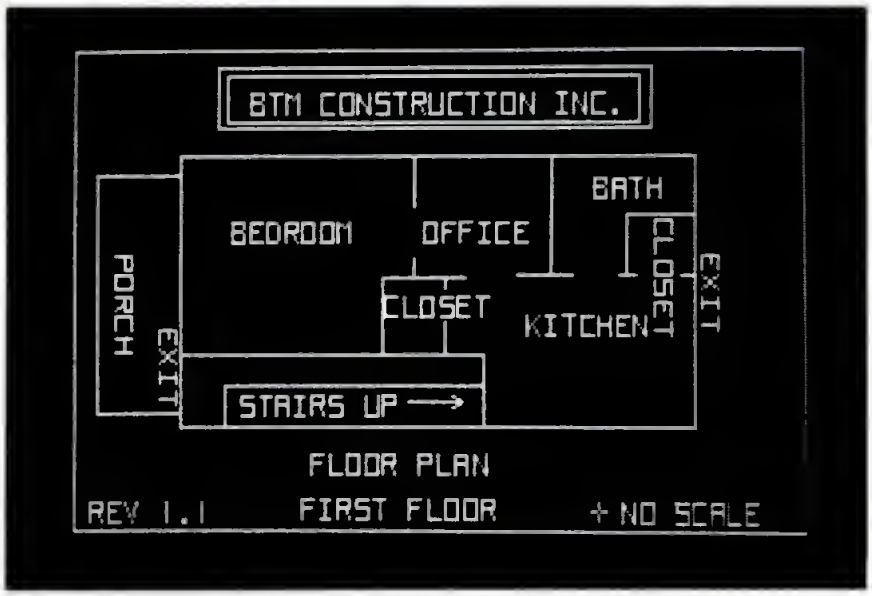
CAD programs are to images what word processors are to words: You use them to create, edit, and make hard copy, but the medium is pictures.







This *AutoCAD* screen of a floor plan demonstrates how the program can assign different colors to different layers.



A *VersaCAD* screen shows one layer of a simple residential floor plan. The drawing is not yet scaled.

may be created as ends in themselves, or they may communicate ideas, such as organizational diagrams or logos. A common use of CAD is to have a drawing conform to a drafting language—complete with notes, scales, and dimensions—to illustrate a design concept, such as a building to be built or a unit to be manufactured.

CAD programs that can create shaded 3-D images may be used to provide realistic simulations of how a design might appear before it is manufactured. A stored CAD database can also be used with engineering analysis programs to test the performance of a design under simulated stress. This feature alone, referred to as CAE (computer-aided engineering), can save designers dollars and hours by detecting problems while still in the design stage. Another application, CAD/CAM (computer-aided design/computer-aided manufacturing) uses a CAD database to drive programs and machinery that manufacture an object.

Is It Worth It?

CAD capability on the IBM PC may be limited compared to what larger systems can do, but a micro-based system can make sense on a price/performance basis. If 80 percent of large-system performance can be achieved with a micro-based CAD system, it certainly might be worthwhile to invest in a configuration that costs con-

PRODUCT INFO

AutoCAD, Version 1.4
AutoDESK, Inc.
2658 Bridgeway
Sausalito, CA 94965
(415) 332-2344
List Price: $1,000. Advanced drafting extensions (cross-hatching, dimensioning, sketch mode, partial line deletion, array command), $500. Program updates, $240.
Requires: 256K RAM, DOS 1.1 or 2.0, two floppy disk drives.

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VersaCAD, Version 3.0
T & W Systems, Inc.
7372 Prince Dr., Suite 106
Huntington Beach, CA 92647
(714) 847-9960
List Price: $1,995 (includes 1 year free updates).
Requires: 128K RAM, two floppy disk drives, monochrome monitor with monochrome adapter card, color monitor with color/graphics adapter card, two RS-232 serial ports, digitizer, pen plotter.

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siderably less than 80 percent of the larger system's cost.

Even if the system is not fast enough or not custom-tailored to your application, CAD still may offer decisive productivity gains over manual techniques. No matter what system is used, CAD gives the largest productivity gains on repetitive tasks, but speed isn't the only consideration. Added quality control, the ability to store drawings on disk, interface with other programs, and a computer that can double for word processing, structural analysis, and other tasks are gains to consider.

A small CAD system may also be useful in conjunction with a larger system. The small system can be used for less demanding drawing, for training, or to free the larger one for complex jobs. It could also serve as a preprocessor to the larger system if file compatibility is possible.

General-Purpose CAD Programs

Four companies have already tossed CAD software into the micro ring: AutoDesk introduced its *AutoCAD* package in 1982; T & W Systems introduced *VersaCAD* for the IBM PC in 1983, having already developed CAD packages for Apple II computers; and the two most recent entrants stepped into the picture in late 1983—Personal CAD Systems introduced its *CADplan* package, and BG Graphics offered its *Drawing Processor*. (For a detailed review of Version 1.30 of *CADplan*, see "A Day in the Life of CADplan," *PC*, Volume 3 Number 9).

All of the packages fall into the general-purpose CAD category, which means that they provide drawing creation and

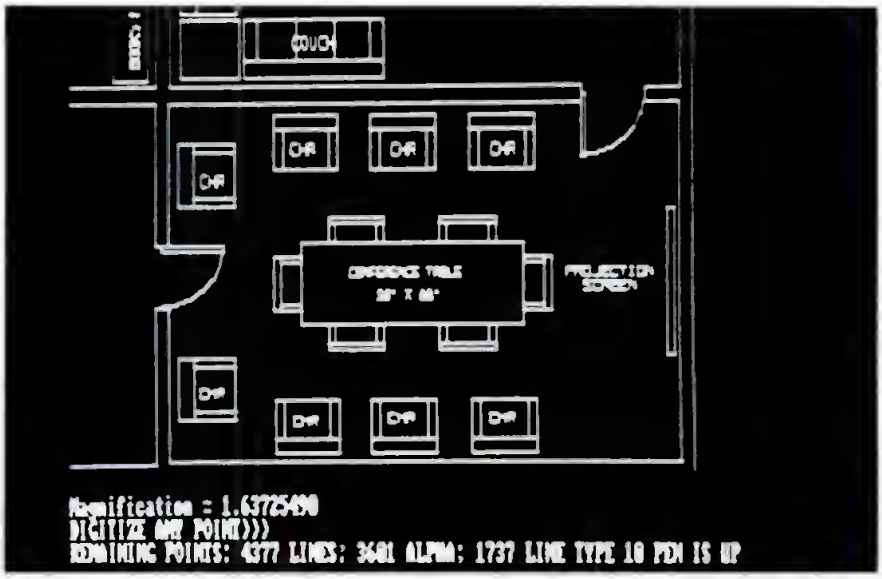
PC PRODUCTS

Drawing Processor, Version 1.01
BG Graphics Systems, Inc.
824 Stetson Ave.
Kent, WA 98031
(206) 852-2736
List Price: $995. Program updates for 1 year, $100.
Requires: 256K RAM, two floppy disk drives, color/graphics card, two RS-232 serial ports, digitizer, pen plotter.

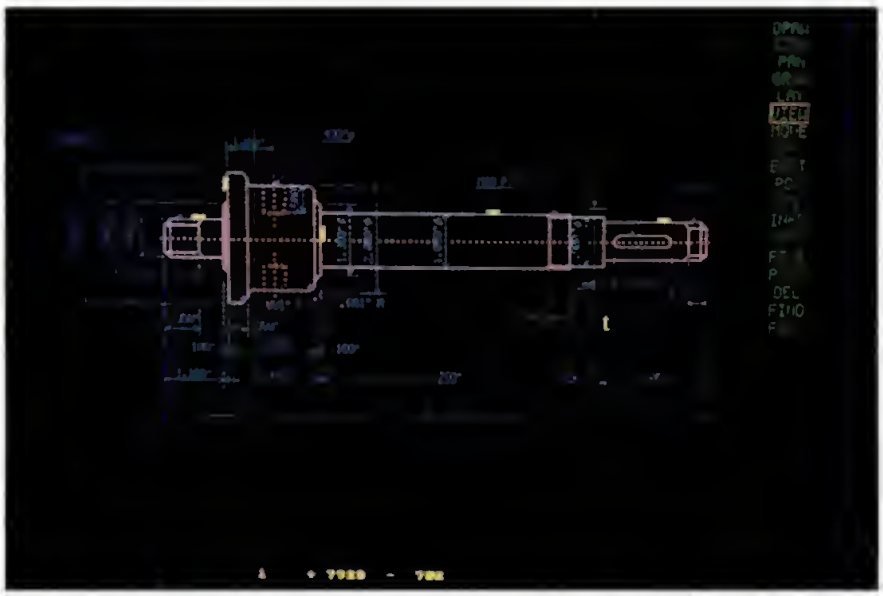
CIRCLE 662 ON READER SERVICE CARD

CADplan, Version 1.35
Personal CAD Systems, Inc.
981 University Ave.
Los Gatos, CA 95030
(408) 354-7193
List Price: $1,200. Database extraction option, $350. Dimensioning package, $250.
Requires: 320K RAM, IBM color/graphics card and color monitor, RS-232 serial port, mouse.

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The furniture elements in this *Drawing Processor* layout may be stored in an object library and placed in drawings when needed.



***CADplan* creates this multicolored display of a gear when the View option is selected from the screen menu.**

editing tools common to many engineering or general graphics applications but are not specialized for any one particular discipline. All are menu-driven, two-dimensional CAD packages.

Floating-Point and Integer Formats

CAD programs typically store drawing elements, sometimes called "entities," in an image database. An important CAD program classification is the numerical format used for the image database. This format dictates the size of the world coordinate system with which images are described by the database (see sidebar, "Is It Really CAD?"). The larger the world coordinate system, the higher the potential resolution of the image and the more detail that can be stored. One of two numerical formats is commonly used: floating-point or integer.

If the program uses floating-point numbers, very high image resolution (as high as 1×10^{15} by 1×10^{15}) and accuracy are possible, although image storage and processing power needs are high. Also, because large amounts of detail are stored, you can zoom into sections of the drawing with ultra-high multiples of magnification.

Integer-based CAD programs, on the other hand, store lower-resolution images, usually around 65,000 points vertical by 65,000 points horizontal. Consequently, they use less memory for the database and usually run faster than floating-point programs, but some precision is sacrificed. Another possible disadvantage is that image rescaling may be performed by only fractional amounts, such as ½ or ⅛, and not by decimal amounts.

With a "zoom in" command, the program will map a small section of the drawing to the entire display, so you can focus in on details.

Integer-based programs are useful for applications that favor speed over precision, but they can still achieve a level of detail that's adequate for a wide range of applications.

AutoCAD and *VersaCAD* use floating-point format, whereas *Drawing Processor* and *CADplan* are integer-based.

Hardware Requirements

All four programs are written for the IBM PC, although the companies offer other versions for the XT and IBM PC clones, and some have versions for slightly more powerful computers. The chart, "Hardware Supported by the Four Programs," with this article lists computers and peripherals supported by each of the programs.

VersaCAD requires a dual-screen IBM configuration with both monochrome and color/graphics adapter cards. The monochrome screen is used for program status information and/or menus and the color screen for graphics, a desirable arrangement. *CADplan* uses the color graphics screen for status, menus, and display. *AutoCAD* and *Drawing Processor* let the

Glossing It Over

By way of introduction to CAD and its specialized language, here are a few essential definitions.

absolute coordinates: Coordinates based on points that are *x*, *y*, and *z* distances from a fixed origin.

aspect ratio: The ratio of image height to image width when displayed on an output device.

digitize: To input and register coordinate information about an image so that it may be processed by a computer.

digitizing tablet: A tablet with a cross-hair or stylus pointer that is used to input information about an image's coordinates.

entity: A drawing element, such as a line, circle, or arc, that is listed in a CAD database.

layers: Levels of a CAD drawing that can be superimposed on a display or plotter.

objects: Drawing elements, such as furniture components, that are stored in a graphic database and placed in drawings as needed.

pixel: On a raster display, the smallest resolvable point of a displayed image that can have a specified color or intensity level.

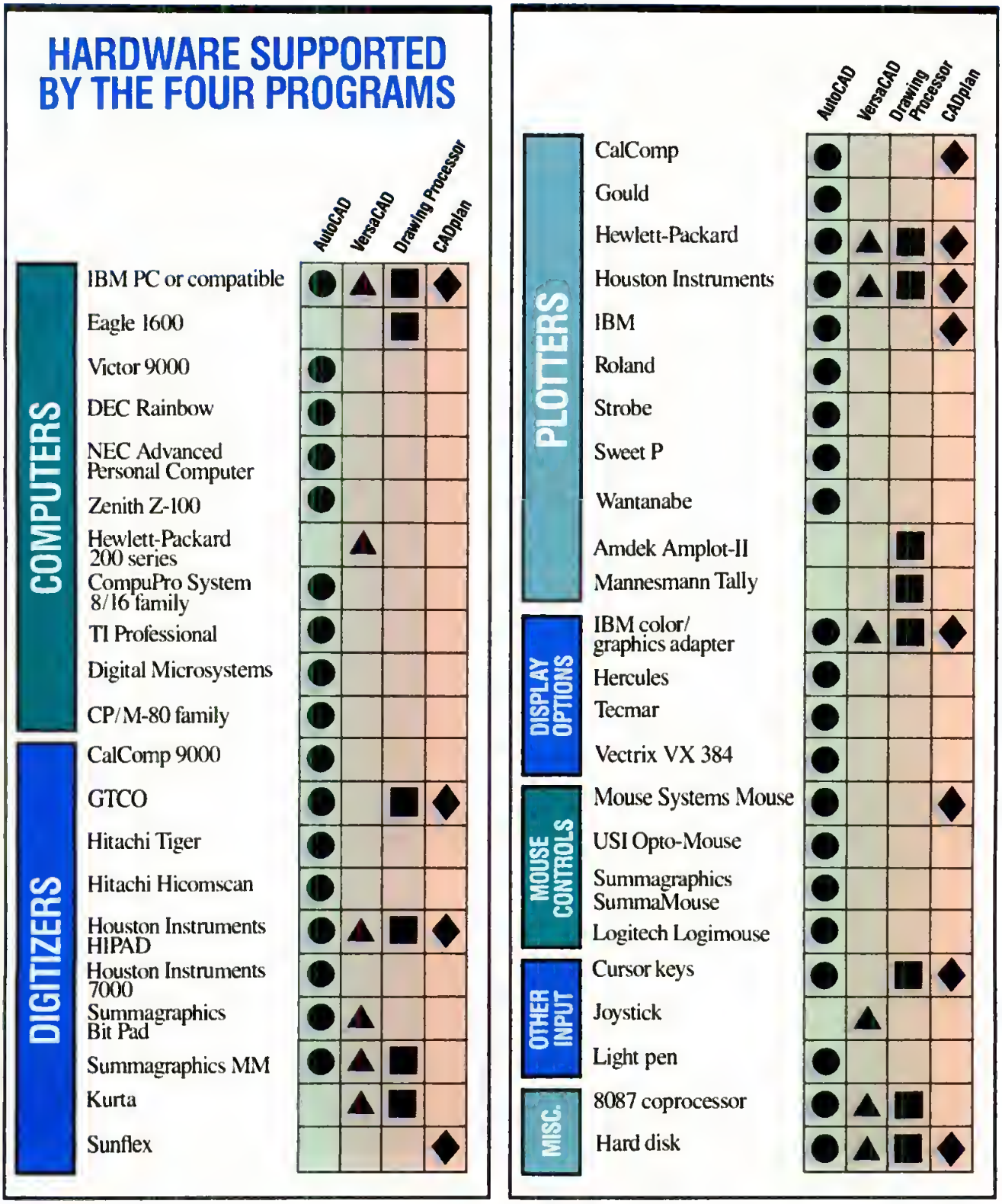
puck: The hand-held, cross-haired pointing device, used with a digitizing tablet to input data.

relative coordinates: Coordinates located in terms of *x*, *y*, and *z* distances from an unfixed origin.

rubberbanding: A CAD feature that creates a movable line, fixed at one end point, that contracts and expands to follow the screen cursor movements.

world coordinate system: A coordinate system unrelated to an input or output device.

HARDWARE SUPPORTED BY THE FOUR PROGRAMS



user configure the program for either a single- or dual-screen arrangement.

All programs except *CADplan* support the 8087 math coprocessor, and in most cases its use noticeably enhances performance. *AutoCAD* and *VersaCAD* can run without it, but it is highly recommended for *Drawing Processor*.

Objects and Layers

Two very powerful features of many CAD programs are object definition and software layering.

Object definition lets you create and store special objects or symbols and maintain them in an "object library." These objects could be drawing elements you would reuse frequently, such as logic gates, door swings, or furniture components. A good CAD program should let you create, store, and then place an object in a new drawing at any time. During placement, you should be able to scale, rotate, stretch, or repeat the object. After placement, an object may be edited in one of two ways: as a single entity (its component entities cannot be separated) or as the collection of its independent entities.

A CAD program should have utilities that let you keep track of what is in the object libraries and let you share object libraries between drawings. The ability to create a menu of frequently used objects on the screen or digitizing tablet may be convenient. Another feature, found only in *AutoCAD*, is the ability to nest objects within objects, but its use requires careful preplanning.

Software layering is another important feature of most CAD packages. You can think of this process as several imaginary Mylar overlays of superimposed drawings. Software layer 1 might contain a floor plan layout; layer 2 a structural plan superimposed over the floor plan; layer 3, a mechanical plan; and so on. The layers can all be turned on, or you may select only those you need at a given time. Layers can also be used to send information selectively to the plotter.

A good CAD program should support at least 30 layers and have the ability to switch entities and objects between layers once they have been defined. Only three of the programs reviewed fulfill these qualifications. *Drawing Processor* does not have a layer feature, but it does store special codes to let you isolate selected drawing parts at plot time.

A color monitor works well with the use of layers, but not all programs support color, particularly if they use the PC's high-resolution graphics, which are only available in monochrome mode. If color is used, it can be assigned to individual layers, which makes it easier to tell them

Is It Really CAD?

It depends on whether the program stores graphic data in a pixel-based or a vector-based format.

Many graphics programs are capable of creating and editing images, but there is a distinct difference between those that offer true CAD and those that do not.

Popular graphics programs are often pixel-based. Such programs store an image in memory in a format that resembles the computer's display buffer. The image conforms to a Cartesian coordinate system; its resolution, or x and y axis lengths, is limited to the horizontal and vertical resolution of the display system used. Stated another way, the number of pixels on the screen equals the number of bits that comprise the image.

When this stored image is transferred into the display buffer, a direct bit-mapping of display buffer bits to screen pixels puts the image on the screen. A bit turned on in memory will illuminate a corresponding screen pixel. A pixel-based program, in a sense, stores screens.

True CAD programs, on the other hand, store data in a vector, or list, format that is independent of any device, including the display system. With this technique, each individual component, or entity, of the drawing is listed in a database.

An entity could be an individual line, rectangle, circle, arc, ellipse, or curve. Each stored entity is listed by type, placement, size, and direction by x and y end points within a Cartesian coordinate system. The size of the coordinate system used is limited only by the numerical format of the computer language. Because the coordinate system is unrelated to any particular input or output device, it is sometimes referred to as the world coordinate system.

A pixel-based program might store a circle as a collection of points that describe its circumference. A vector-based program would store the circle as a command describing the entity type (a circle), a center point location, and radius length.

Pixel-based Pros and Cons

With a pixel-based program, the stored image resolution is the same as the display resolution, so the program may not take full advantage of devices that are higher in resolution than the display. For example, if a pixel-based image created on a medium-resolution monitor is sent to a high-resolution pen plotter, pixels will be plotted as points, and visible "jaggies" will appear in diagonal lines and in circles, even though the plotter is capable of much greater detail.

Another problem is that if the pixel-based program lets you magnify sections of the display, you will see more pixels devoted to the same drawing elements,

apart when they're all turned on. It is not necessary, however, to have a color display to achieve color on the plotted hard copy; different layers can be assigned to different colored plotter pens through software.

Getting Around on the Screen

How essential is high screen resolution? It's important, but not mandatory, because of the powerful zoom and pan features of CAD programs. If a drawing has too many points to be viewed clearly at one time on a low-resolution monitor, the display can instead be used as an adjustable "window" (called a "viewport" in CAD lingo) to view sections of the larger drawing. A pan command lets you move across the drawing to see different sections. With a "zoom out" command, you'll see a larger portion of the drawing with less definition; with a "zoom in" command, the program will map a small section of the drawing to the entire display, so you can focus in on details. Zooming in increases accuracy if you use the screen cursor to place points.

> The ability to zoom and pan can make up for low resolution on the display.

Bear in mind that if you use a higher-resolution display system, there will be more pixels available on the display, and you can see more information clearly and place points more accurately without as much zooming. Also, for applications that rely heavily on the aesthetic composition of elements, the ability to see the "big picture" clearly would be helpful.

For Good Measure

Other features used as display aids are database units, temporary grids, resolution commands, and "snap" commands.

Before starting a drawing, you must first organize the world coordinate system into some convenient database units.

For example, you could relate the database units to feet and inches. If you are inputting a floor plan that is 100 feet long by 50 feet wide, you may choose your database units as 100 in the *x* direction and 50 in the *y* direction, and call them "feet." At plot time, the database units will be scaled so that the drawing will fit on whatever size plotter sheet you are using. Common architectural scales, such as 1 foot = ¼-inch, can be chosen. *(continued)*

but no additional detail.

Are there advantages to a pixel-based program? Certainly. Drawing storage and processing speed requirements remain constant no matter how many entities the image contains. Because the program isn't constantly scanning through a database, you rarely need to wait long for an image to regenerate on the screen after making changes. Pixel-based programs are sometimes referred to as paint programs, because they favor speed and spontaneity—good for freehand-style drawing—rather than precision. As higher-resolution monitors become commonplace, pixel-based programs will gain precision, although greater resolution will also mean that more memory is required to store each image.

The Real Thing

Vector-based CAD programs produce different trade-offs accompanied by their own set of advantages. Because the image database format is independent of any particular device, an image can be stored at a very high resolution; it can then be sent to any device, such as a pen plotter, at the device's full resolution. If a zoom command is used when the image is displayed on the screen, the CAD program will show more drawing detail, not just more pixels allotted to the same drawing elements. That's because the detail is stored at a resolution greater than the display.

Another advantage is that the program can add intelligence to a purely graphic database because drawing entities are "listed." Various line segments or line segment combinations residing in the database can be tagged by the program as wall segments, for example. Costs may then be tabulated if the program counts the total number of wall segments and multiplies by the unit cost. Taking this further, the graphic database can reference assorted information about the wall segment, such as unit cost, surface area, supplier, finish, color, or other specifications.

Finally, with the high accuracy of the stored database and a high-resolution pen plotter, the program can easily and accurately relate the coordinate system units used in the image database to some identifiable scale on the plotted hard copy, perhaps a fraction of a foot.

If you need to create scaled, accurate design drawings and tabulate costs or reference specs, or if you require accurate, plotted hard copy, your choice would have to be a CAD (vector-based) program.

There are drawbacks to CAD programs, too. Each new graphic entity requires an addition to the image database, so that a complex drawing results in a very large database. Substantial processing power and efficient code become crucial for scanning the database and generating the image—without them, operation will be sluggish and screen regenerations slow. Finally, truly responsive freehand-style drawing and editing are much less feasible with a vector-based program than with a pixel-based program. —A.E.M.

Another method might be to define the world coordinate system as 36 database units in the *x* direction and 24 in the *y* direction so as to relate to the size of a plotted 24-inch by 36-inch architectural drawing sheet. In this case, although the elements you input must conform to these units, you won't need to scale the drawing at plot time.

A temporary grid may be placed on the screen to give the operator a visual sense of the database units, and temporary drawing resolution can be defined. For example, if the drawing resolution is set at one-tenth of a database unit and used with a snap command, any points inputted with the screen cursor will automatically "snap" to the nearest point at that resolution. This lets you place points quickly with the screen cursor without constantly zooming in to check their exact placement.

One more important feature is the use of keyboard input for absolute or relative coordinate entry. By keyboarding the *x* and *y* coordinates of a point in database units or fractions thereof, the relatively low resolution of the display is bypassed, and extremely precise input can be achieved. Keyboard entry usually overrides any active resolution or snap commands.

The four programs support standard IBM PC graphics, but with variations. *VersaCAD* and *CADplan* support only medium-resolution graphics, and *Drawing Processor* supports only high resolution. *AutoCAD* lets you configure a system with either medium or high resolution, depending upon whether you favor color or better resolution. *AutoCAD* also supports several enhancements for graphic display.

Viewing commands that allow you to pan and zoom are important. As a database gets larger, the extra time required to regenerate an image after each pan or zoom can lead to "wait time." (Contrast this with larger systems that allow for almost instantaneous pan and zoom.)

To make the best of it, look for features that let you pan to previous drawing sections, zoom into windows or through a variety of scales, or otherwise simplify procedures. *VersaCAD* and *CADplan* are especially versatile in this respect—both allow you to define up to five different drawing windows and pan back and forth between them. *Drawing Processor* lacks a pan command; you can zoom out and then zoom in on a different section of the drawing for the same effect, but this involves an additional step.

Features that speed up image regeneration are also timesavers. For example, *VersaCAD* lets you temporarily toggle text lines to straight lines, because regenerating text after each pan or zoom can be slow. And both *VersaCAD* and *CADplan* provide efficient use of layers—if you switch off all currently unused layers that contain entities, the program speeds up, taking time only to scan and redraw entities on the active layers. *AutoCAD* offers noticeably less control by comparison; its database structure requires the program to spend time scanning entities residing on layers even if they aren't turned on. *AutoCAD* does let you temporarily toggle off all solid-filled areas to speed image regeneration.

A program should be able to support several different types and brands of input devices, including mouse and digitizer.

Input Device Variations

There are two varieties of graphic input with a CAD program: Direct mode and Tablet mode. With the Direct mode, you create images directly on the screen using the screen cursor and graphic commands. You may use any input device, such as cursor keys, a joystick, a mouse, or a digitizing tablet.

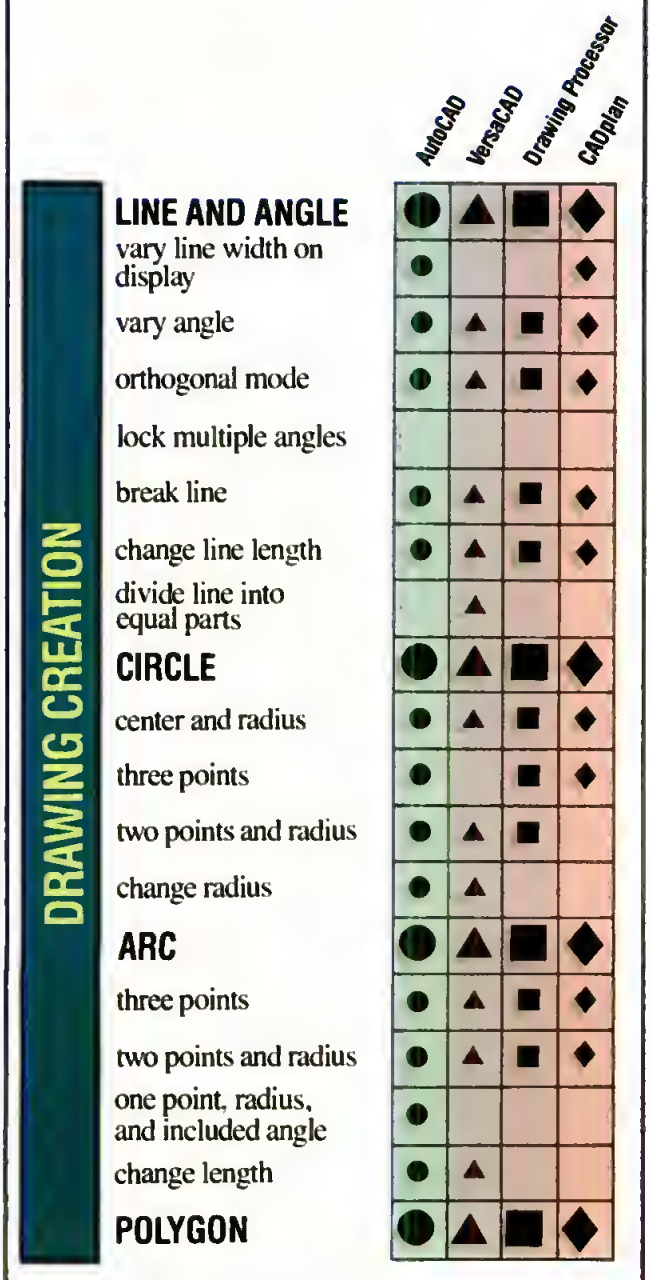
Tablet mode is used to input an existing hard copy drawing, and only the digitizing tablet may be used with this mode, because it is very accurate and uses absolute coordinates. You tape the drawing to the tablet surface, trace the drawing with the tablet "puck," and use graphic commands to enter the shapes while the image forms on the screen. Tablet mode lets you proportion the scale of the existing drawing to the database units used in the program and maintain the drawing's proper aspect ratio.

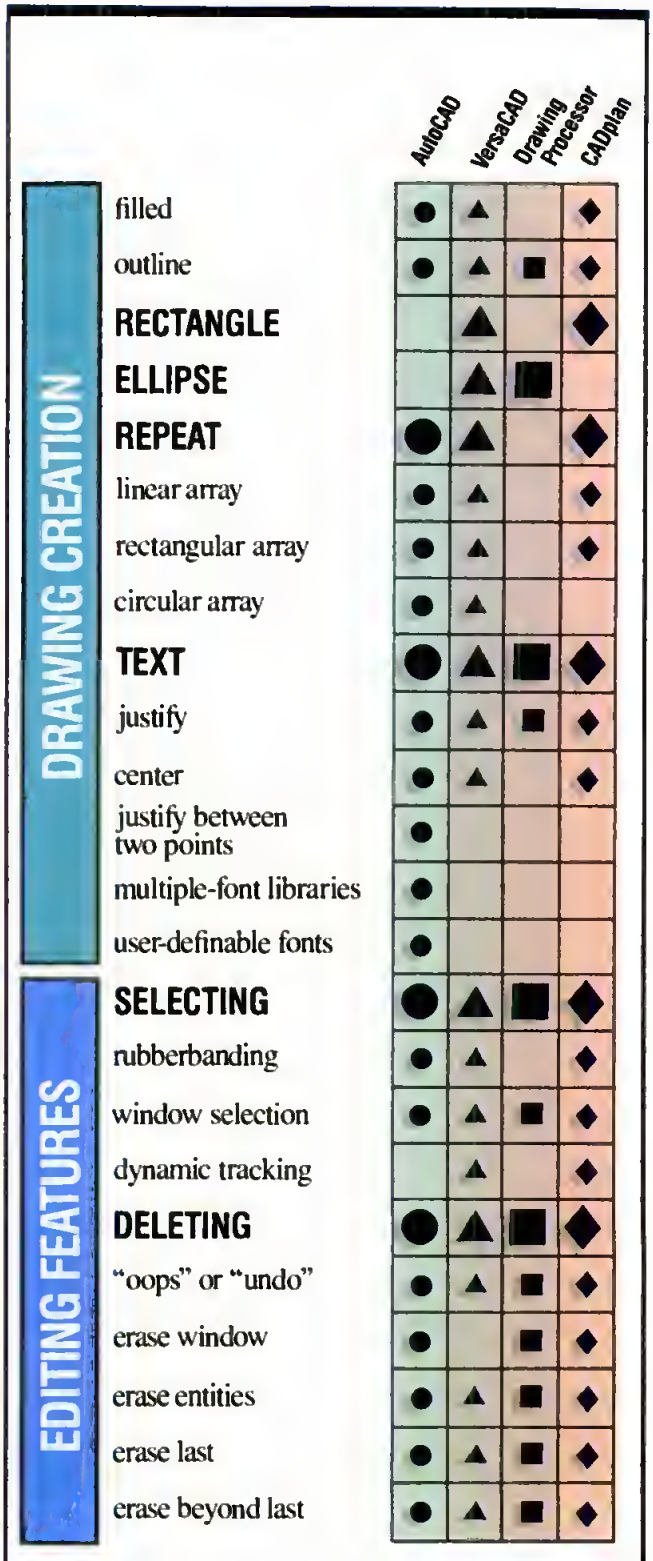
A program should be able to support several different types and brands of input devices, including mouse and digitizer. The Mouse Systems Mouse was used for this review, and it worked well. For a digitizing tablet, the Houston Instruments HIPAD was chosen for the review because it is supported by all four programs. (It's also one of the least expensive tablets around.) If a Tablet mode is needed for tracing existing drawings, or if you prefer to use a tablet menu rather than a screen menu, the digitizing tablet is essential. Some programs may also support the use of buttons on the tablet puck to choose or toggle certain commands. Bear in mind that a digitizing tablet requires special cables and a little more interfacing know-how than a mouse.

AutoCAD clearly shines when input devices are to be used. It supports the widest range of input devices, all of which can be configured by the user. This means that you can configure different disks and switch easily between, for instance, a mouse and a tablet.

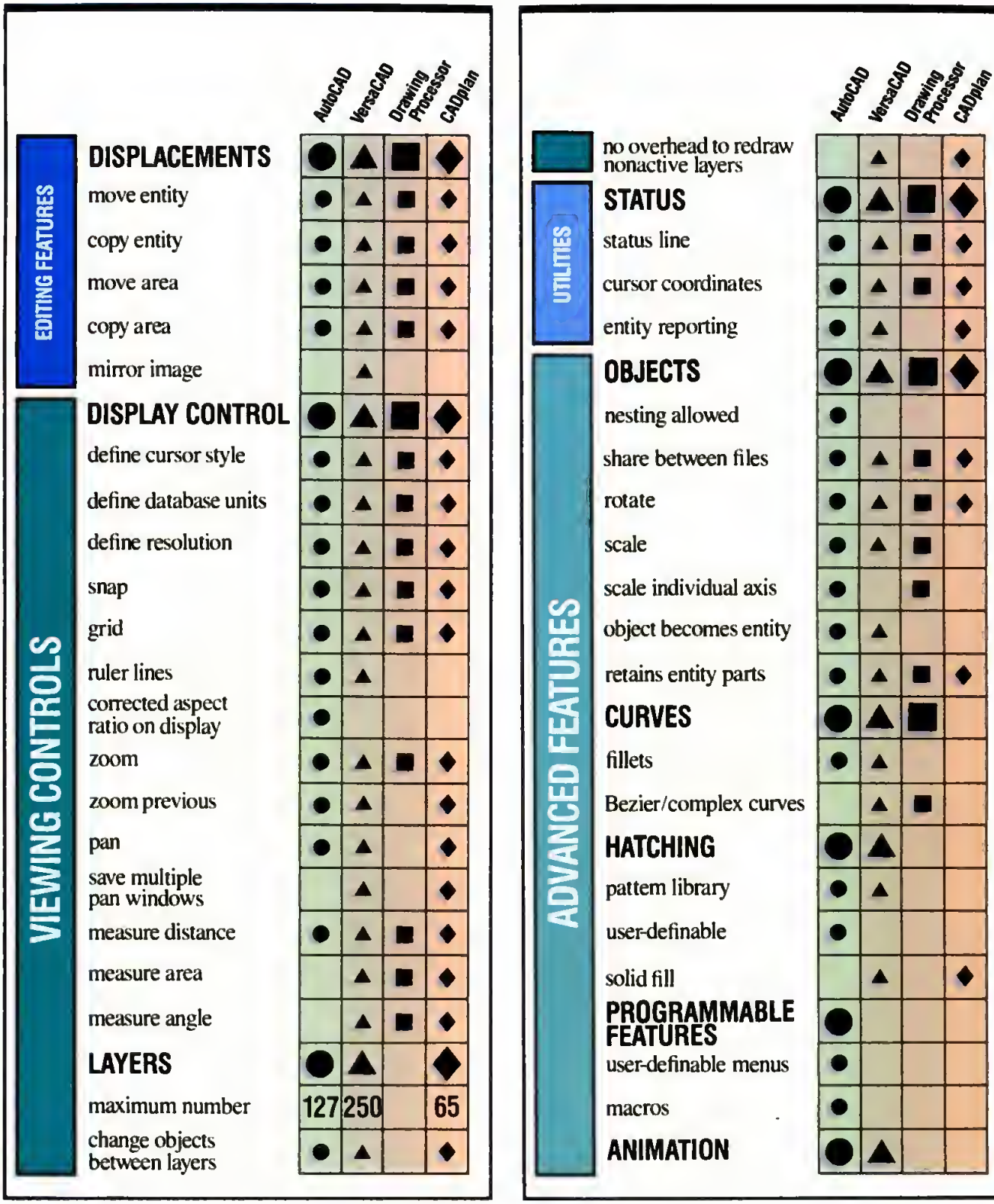
Using *AutoCAD*, the tablet puck may be used to point to the screen menu by configuring a menu directly on the tablet surface; this may give your eyes a break since they won't be constantly focused on the screen. *VersaCAD* supports digitizing tablets (although it doesn't support a tablet menu) and joysticks, but it lacks support for mouse and cursor control keys. *Draw-*

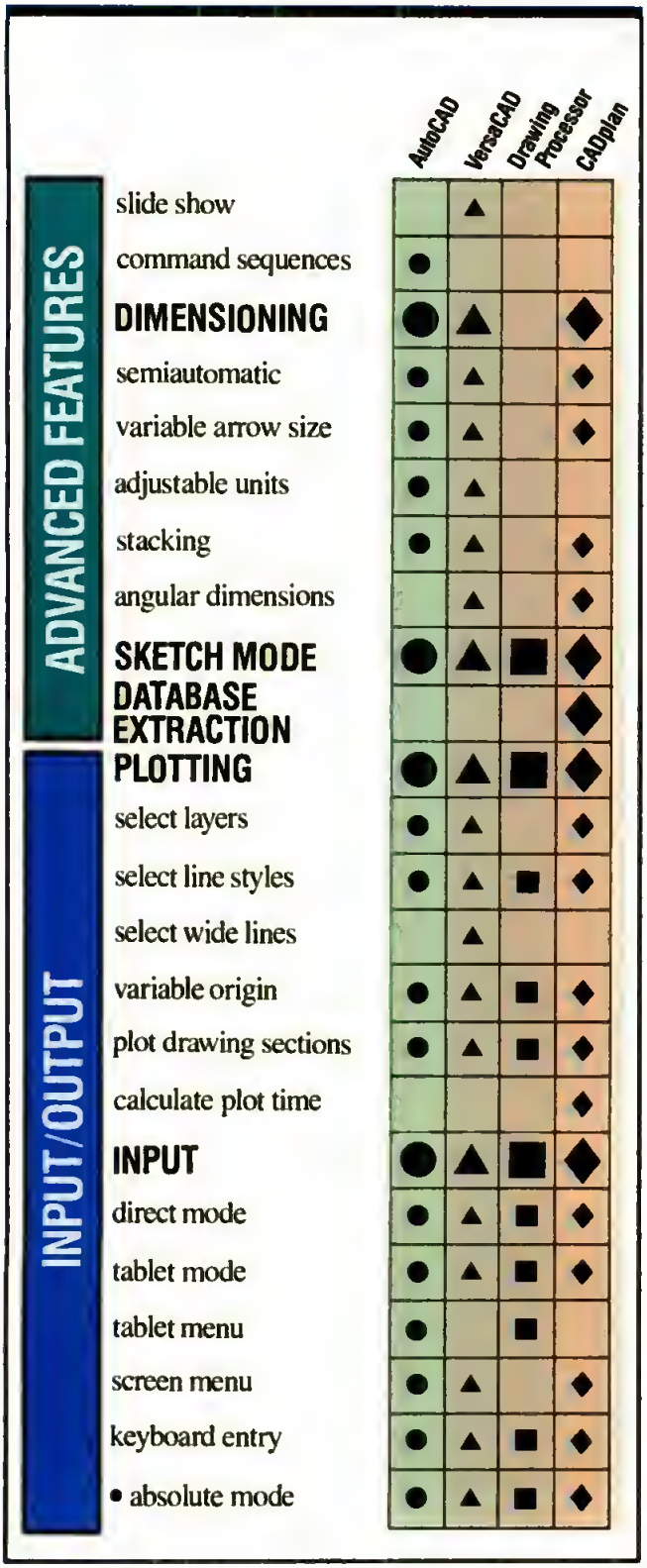
FEATURES COMPARISON CHART

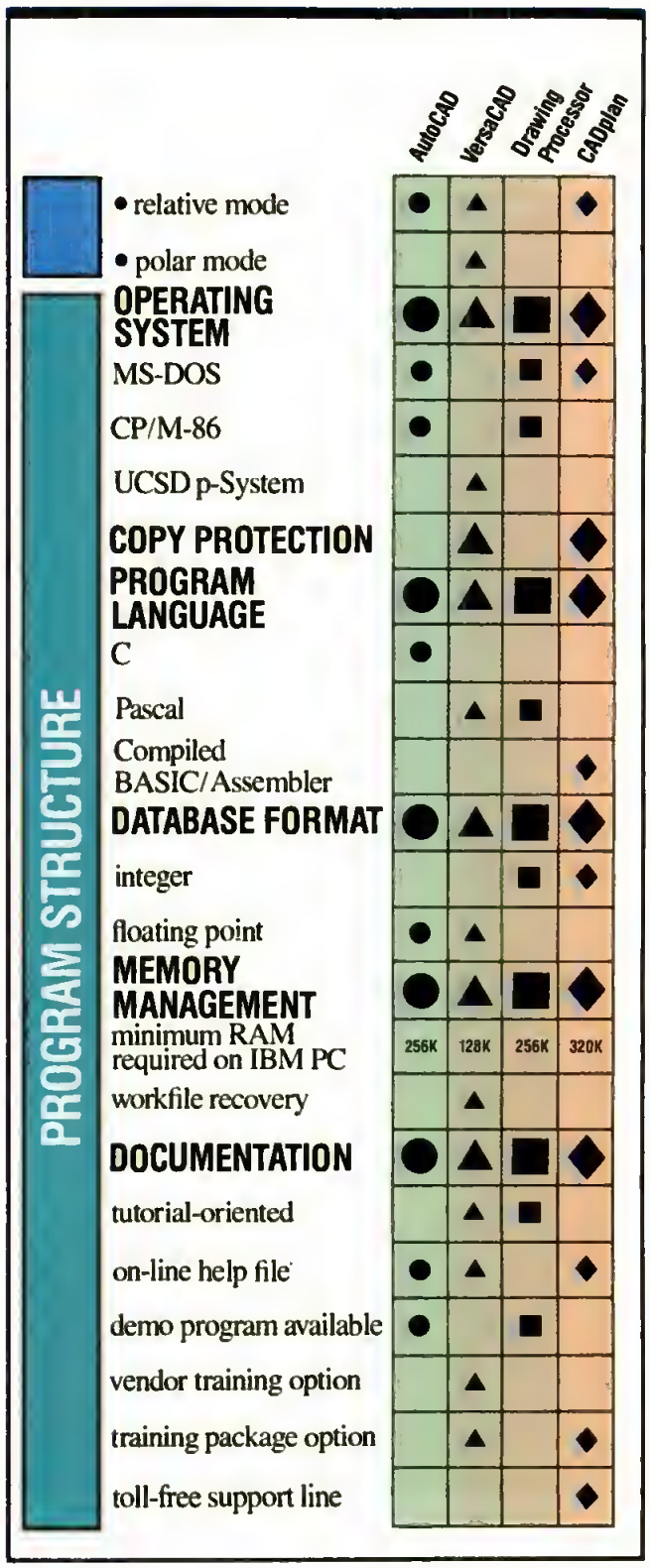




GETTING THE PICTURE




AutoCAD
VersaCAD
Drawing Processor
CADplan
ADVANCED FEATURES
slide show
command sequences
DIMENSIONING
semiautomatic
variable arrow size
adjustable units
stacking
angular dimensions
SKETCH MODE
DATABASE EXTRACTION
PLOTTING
INPUT/OUTPUT
select layers
select line styles
select wide lines
variable origin
plot drawing sections
calculate plot time
INPUT
direct mode
tablet mode
tablet menu
screen menu
keyboard entry
• absolute mode


AutoCAD
VersaCAD
Drawing Processor
CADplan
• relative mode
• polar mode
PROGRAM STRUCTURE
OPERATING SYSTEM
MS-DOS
CP/M-86
UCSD p-System
COPY PROTECTION
PROGRAM LANGUAGE
C
Pascal
Compiled BASIC/Assembler
DATABASE FORMAT
integer
floating point
MEMORY MANAGEMENT
minimum RAM required on IBM PC
256K
128K
256K
320K
workfile recovery
DOCUMENTATION
tutorial-oriented
on-line help file
demo program available
vendor training option
training package option
toll-free support line

ing Processor supports only a digitizer (it uses a tablet menu but no screen menu) and cursor control keys, and *CADplan* is designed specifically to be used with the three-button Mouse Systems Mouse. The program also supports several digitizing tablets, but without tablet menus.

Output Devices

The pen plotter is the output device most commonly used with CAD programs. It accepts commands in a vector format at a very high resolution, a compatible feature for CAD. A graphic screen dump to a dot matrix printer is also possible, but, as with any graphic screen dump, the resolution of the printed image is as low as the display resolution.

The plotter driver should allow you to relate the database units used in the drawing to some unit of measurement on the hard copy, such as a fractional part of an inch or millimeter. The driver should also let you assign software layers to different pen colors or different line styles and widths. You must be able to plot the layers selectively if desired. The plot origin on the paper should be under software control. Features to let you plot the entire drawing or just a section are helpful.

The HP 7475A plotter, probably the highest performance "b" sized unit (approximately 10-inch 15-inch plot size) supported by the four programs, was chosen for this review. It was easy to interface and performed flawlessly. Because plotter cost rises dramatically with size, a high-performance "b" size plotter can be an alternative to a comparably priced, low-performance "c" or "d" size plotter. With good plotting controls in the program, large drawings can be assembled from smaller sections.

Evaluation

I can't help but be especially impressed by *AutoCAD*. It has many professional-level features, and even if you don't find the feature you want, you might be able to create it. Its user-definable menus, macro features, and support of numerous devices

A CAD Shopping Guide

There are myriad features and factors to consider when buying a CAD system. Draw your own conclusions about which ones are most important.

Even the less-sophisticated micro-based CAD systems can perform an astounding variety of tricks, and an important step when buying a system is deciding which features are essential for your application and which ones you can live without. Here's an overview of features to look for, with notes on how *AutoCAD*, *VersaCAD*, *Drawing Processor*, and *CADplan* handle them. (The features comparison chart gives a detailed list of what each of the four programs can do.)

Common Features

Drawing creation: CAD programs usually give the user a number of ways to draw and edit lines, angles, circles, arcs, and polygons. Lines may be shortened or lengthened, broken, or divided into equal parts. In some cases, the width of the line can be changed on the display or at plot time.

With most systems, you can pick end points with the screen cursor, and some programs also give you the option of keyboarding absolute or relative coordinates. Circles can be created by specifying three points, a center point and a radius, or two points and radius; arcs, by three points, two points and a radius, or one point, a radius, and an included angle; ellipses by major and minor axes. Polygons can be drawn in outline and, in some cases, with solid fill. A repeat or array function lets you make linear, rectangular, or circular arrays of entities or objects.

Text functions: The ability to adjust text height and angle of orientation, center text, and justify it between two points can greatly improve the appearance of an annotated drawing. If the program's text command supports multiple font libraries and lets you create your own fonts, all the better. Any additional word processing features aid the drawing process.

Editing features: "Rubberbanding" creates a movable line, with a fixed point at one end and the cursor at the other, that stretches and contracts on the display as the cursor is moved. "Dynamic tracking" lets you view the size and attributes of entities while placing them with the screen cursor so you can choose the placement that looks best before making a commitment on the drawing. Adjustable "windows" can be placed around areas on the display, and you can copy, move, or erase these areas or individual entities.

Commands that allow for partial deletion, changing an entity, changing vertexes, and breaking lines make drawing more spontaneous because you can change drawing elements without having to erase and recreate them. An "oops" or "undo" command to recover from erroneous input is essential.

Display control: Display control is enhanced when a program permits you to define database units and resolution and use snap, zoom, and pan features. An orthogonal mode resembles the use of a T-square and triangle in manual drafting, forcing all lines greater than 45 degrees vertical and less than 45 degrees horizontal. It speeds the drawing process by ensuring precise placement of horizontal and vertical lines. An orthogonal mode that lets you lock multiple angles for diagonal line placement is a plus for isometric drawings. The ability to change resolution at any time during the drawing

process is also convenient.

A status line or status utilities are essential to keep you informed about display controls that are active. Reporting utilities list coordinate data about existing entities and objects, such as end point coordinates, radii, and center points. Is the display aspect ratio corrected? If it isn't, circles will appear as ellipses on the display, and squares will look like rectangles (although they will appear correctly when plotted).

Pan and zoom commands will probably come in very handy for most applications—make sure they're easy to use. Being able to save previously viewed windows may also prove convenient. Finally, if the program requires extra time to scan entities on layers that aren't currently active, editing may be slowed.

Database file compatibility: Although proposed standards exist, the average program stores its database in an organization that is meaningful to that program only—files may not be interchanged with other programs. If the database format is documented, you have the option of writing a conversion program so you can use the database with another program, convert another database to your program, or write additional device drivers. *AutoCAD* comes with a special program to convert the database to an ASCII file and provides detailed documentation of the file format. Other vendors state that they will provide their database structure upon request.

File handling/memory management: Some programs adjust well to all available RAM, while others require RAMdisks or hard disks. Keep in mind that the number of entities and objects on a drawing may be limited by RAM size. And find out what happens if you overfill a disk—does the program abort, or do you get a warning? Does the program provide complete workfile recovery in the event of a system crash?

Advanced Features

Fillets, complex curves, and Bezier curves: Fillets create curves tangent to any two intersecting lines by choosing the two lines and a radius. Complex curve and Bezier commands are used to form connected series of curves tangent to each other or to other entities. *Drawing Processor* and *VersaCAD* are particularly powerful in this respect.

Hatching: The ability to fill enclosed areas with any one of a library of hatch patterns is a useful feature. *AutoCAD* provides for user-definable hatch patterns.

User-definable menus and macros: User-programmable menus let you group your own menus on the screen or tablet for a particular application. A macro feature lets you create a sequence of several menu commands that can be initiated by one command; preferably, you can add automatic pause within the sequence for user input. Both features can be put to good use—they help you customize the program for your individual application. For example, one macro can implement a sequence of menu steps to change resolution and grid size, toggle out of tablet mode, pan 20 database units to the right, and then insert an object.

AutoCAD is clearly the winner here; it's the only one of the four programs with either feature, and it has both.

Animation: The steps used to create an image can be saved in a special command file and replayed rapidly to create animated demos for products, services, advertising, and so forth. *AutoCAD* comes with this feature, which doubles as an automatic method of initiating commands at the beginning of a normal drawing worksession. An optional *VersaCAD* program lets you link screens together in sequence to create slide shows.

Database extraction: For certain applications, a database with user-defined specifications that can be referenced via the graphic database or object library is a particularly useful feature. Interior designers, for instance, could use it to store cost or supplier information about each piece of furniture in a building. *CADplan* is the only program of the four to offer this powerful feature (at extra cost).

Beyond Standard Features

Here are a few advanced features found on CAD programs for large systems, but not in any of the four reviewed programs. These features represent CAD at its best, but be aware that even many large systems don't have them.

Associative dimensioning: This is similar to semiautomatic dimensioning, except that existing dimensions are automatically updated if a drawing part changes size.

Dimensioning: All of the programs except *Drawing Processor* offer semiautomatic dimensioning features to notate sizes of drawing elements. This feature lets you choose where the dimension lines go, and the program automatically measures the distance and writes the dimension text. Additional features may include dimension stacking, angular dimensions, variable arrow size, or other features to add polish to the final drawing. You should be able to choose dimension units, such as feet and inches for architectural notation, scientific notation, engineering notation, and the like.

Sketch mode: A freehand-style mode for spontaneous drawing is available for all the programs reviewed. You won't get the response that a pixel-based paint program might provide, but you should be able to draw free of restrictions from structured drawing controls. A sketch mode is useful for accurately tracing irregular shapes such as land contours. *AutoCAD* clearly has the most advanced sketch mode.

(continued)

and graphics resolutions give you flexibility to customize the program to match your needs. It has very sophisticated object handling, excellent memory management (it has the least frequent disk access of the four programs) and tremendous zoom capability. It's the only one of the four with the display aspect ratio corrected. Also, I personally favor a menu configured on the digitizing tablet.

AutoCAD has been through numerous revisions and is a mature product. It has good documentation and on-line help, but don't expect to be an old hand at using this feature-packed program within an hour.

Unfortunately, *AutoCAD* becomes sluggish on the IBM PC as the database increases in size, but it would probably perform well on a faster computer—this is true of floating-point programs in general. It would help tremendously if AutoDESK restructured the *AutoCAD* database so the program wouldn't waste time scanning entities on nonactive layers.

VersaCAD is also a mature program that's also loaded with sophisticated features. It has strong object handling, editing, and reporting features, and seems to be aimed at the professional user.

Although *VersaCAD* is extremely powerful and versatile, it lacks customization features such as user-definable screen and tablet menus, graphics resolutions, macros, and definable fonts and hatch patterns. But if *VersaCAD* has the features you need and supports the devices you have, you may not miss these customization features.

> CADplan is integer-based and the fastest of the four programs, even without the 8087 chip.

VersaCAD does have Bezier curve and ellipse commands, and unlike *AutoCAD* it doesn't get bogged down scanning entities on nonactive layers. Its powerful dynamic tracking feature (see sidebar, "A CAD Shopping Guide") makes the program very interactive and a pleasure to use. *VersaCAD* is the only program of the four with a workfile recovery feature, but this requires frequent disk access, which makes it more suitable for use with a hard disk. The documentation is thorough, and the company offers training programs at its location in California. Although *VersaCAD* is more expensive than *AutoCAD*, it

Parametric objects: Some programs for large systems provide objects that may be placed using parameters that require calculations. For example, an architectural package might provide a staircase as an object; when you place the staircase, you input the floor-to-floor clearance, and the program automatically computes and draws the staircase with the proper rise and run. A hip roof may be drawn automatically with its proper slope after inputting floor-plan dimensions and heights.

The system might provide a programming language that allows calculations and loops so that the user may program his own parametric objects. This feature helps to customize a system to any given application and can greatly increase productivity.

3-D modeling: Once a plan and elevation view are defined, a perspective view of the object can be generated. 3-D CAD systems may be complicated to learn, and they require significant processing power if complex objects are modeled. (See "CS-5 Adds Depth to PC Graphics," *PC*, Volume 3 Number 13, for a review of a solid modeling system for the PC.)

Multi-windows: Some large systems use screen resolutions of 1,024 1,024 or more on raster monitors and use software windowing techniques for graphics. One window may show a floor plan, another may simultaneously show a perspective view of the floor plan, while another may show a furniture object library.

Once you've found a system that matches your needs and budget, consider the stability of the vendor. Most vendors revise their programs several times a year to keep up with competition. A hefty charge for revisions can add considerably to your costs. If a program lacks a minor feature you want but you are impressed by the vendor, there's still a good chance the feature might pop up in a later version.

Checking It Out

Check out the support the vendor has to offer. Is there a toll-free number? Is it always busy? Are there local dealers that can assemble a system for you and provide support? Are there training programs?

To determine whether the system is powerful enough for your needs, be sure to see a demo with a drawing of the complexity that you will be working with. Watch how quickly you can pan, zoom, and edit. Even if the speed is adequate, you may want to investigate whether the program is available for a faster computer, or if there are enhancements that will step up performance even more.

There are as many CAD features as there are applications with which to use them. But, as any computerphile knows, there is no substitute for hands-on evaluation. Most CAD program vendors give periodic demonstrations at sites across the country, and some have dealerships where you can try out a program for yourself. If you want to take a sampler home, AutoDESK offers a $50 demo package for *AutoCAD* that contains most features of the program (the hitch is that you can't save drawing files), and BG Graphics also offers a demo package for *Drawing Processor* for $100. —A.E.M.

includes many features as standard that are optional on *AutoCAD*, and revisions during the first year are free. The program is aggressively updated and should be a leading contender in the micro–CAD market.

Drawing Processor is easy to learn and use, has a good complex curve command, and has good object-handling features. The program emphasizes tablet-mode input, and although it has good direct-mode features, they appear a bit "vanilla" when compared to *AutoCAD* or *VersaCAD*. Also, in comparison with the other integer-based program, *CADplan*, *Drawing Processor* seems slow. It lacks layers, dimensioning, extensive device support, and some reporting features professionals might want. *Drawing Processor* has excellent potential; with a few aggressive updates, it could be a top performer.

CADplan is integer-based and the fastest of the four programs, even without the 8087 chip. The on-screen menu, status lines, and prompts are very friendly, and the program is probably the easiest of the four to learn. It's a powerful package, and if your application requires database extraction, this feature alone might be a reason to choose *CADplan*. Unfortunately, this program lacks a dual-screen option, object scaling commands, floating point, some advanced entity reporting, a tablet menu, and customization features, all of which might be useful for professional applications. *CADplan* is ideal for the infrequent user, for training and educational environments, or where speed is more important than precision.

If you already have an IBM PC, you can now add CAD to your existing computer system at a reasonable cost. This is a low-risk way to learn and grow with CAD at a pace that's convenient for you.

Allen E. Meilach is a Los Angeles computer graphic consultant specializing in architectural CAD, systems integration, and two- and three-dimensional graphic illustration. He has coauthored a computer dictionary and has won several prizes for computer artwork.



CIRCLE 148 ON READER SERVICE CARD

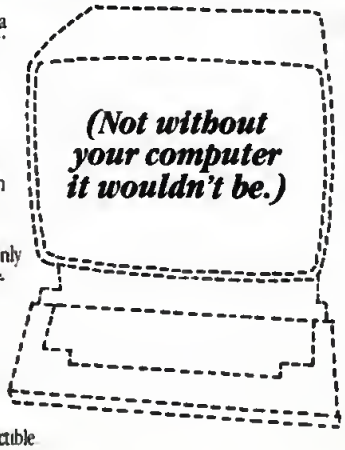
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PCM



A Sporty Compatible

The MAD-1's high-tech look and its 80186 chip make it a Porsche in the Volkswagen world of PC-compatibles. Its careful design enables it to run most PC software.



MAD-1

From your first glance, you know that something is different about the MAD-1. Like a Ferrari, this new PC-compatible looks fast even while sitting still. A short test drive proves the worth of the sport car analogy. Up and running, the MAD-1's performance is as sleek as its looks, but its power is not achieved without cost. You trade advantages for the MAD-1's speed the same way you sacrifice luggage space and comfort for the sporty appearance of a Porsche or a Ferrari.

The MAD-1's speed comes from its 80186 microprocessor, which is faster than the PC's 8088. While it is therefore less-than-perfectly compatible with the PC, Mad Computer engineers have succeeded in making it compatible enough to run most PC software. (See "Lifting the Veil of Compatibility," *PC*, Volume 3 Number 6.)

Since the MAD-1's appearance is so striking, I began my review by looking over the outside. I then peeked under the hood, ran a few programs, and investigated the manuals.

The Outside

The MAD-1 is beautiful. It appears that more thought went into this machine's design than into those of any five of its PC-compatible competitors. The MAD-1 system consists of four components painted different shades of gray that give it a high-tech appearance.

The computer itself is in two parts, the Computing Module and the Data Module. The Data Module houses two half-height, 5-inch, floppy disk drives, and the Computing Module contains the memory, the processor, and other details. These pieces are both about 12 inches wide and 16 inches deep and are designed to sit one atop the other. They form a stack about 5½ inches high and together take up only two-thirds as much space as an IBM PC. Their beveled edges and dark gray color make them seem even smaller than that. The monitor is also 12 inches wide and is designed to sit on top of the stacked components. Deeper than most monitors, it has a tapered back nearly a foot long.

The keyboard is 18 inches wide, 6 inches wider than the other modules, and has 85 keys. It is a medium gray, with a deep wrist rest that makes it more than 8 inches deep in all. The main "typewriter" keys are light gray and the numeric keypad and the function keys dark gray. The legends on the keys are written in black, white, or red lettering.

The keys themselves are laid out in a manner fairly familiar to aficionados of Big Blue's machine. The manual describes it as similar to that of the IBM PC, except that the keys are "more conveniently" arranged. The function keys are set in two groups of five in a row at the top left edge. The troublesome Backslash key has been moved out of way to the upper left-hand corner next to the Esc key so that you now find the left-hand Shift key where you expect it. (That is, unless you have grown accustomed to its place on the IBM layout.) The CapsLock key has a light on it, so you can tell if it is on or off.

Unfortunately, the NumLock key does not have such a light. The designers also made it large and long and put it on the right edge of the main keyboard area. As a result, it looks and feels just like a Return key. Since it doesn't have a status light, you can't tell what state the numeric keypad is in after you have hit the NumLock key by accident a few times.

The MAD-1 keyboard's other quirk is its sound. The keys feel pleasantly resilient, giving you good feedback. Unfortunately, this feedback seems to be created by small springs in each key that make a "sproing" sound with each keystroke, a mechanical noise that you can't turn off as you can the keyboard sounds of other computers. Since different keys make different sounds, a fast typist sounds like a pogo stick orchestra performing a symphony. A Mad Computer representative says that the company recognizes this problem and plans to change keyboard mechanisms, but will probably not do so before the end of 1984.

A stroll behind the system yields some nice surprises. On the back of the Computing Module, I found the connector for the video display, a modular telephone plug socket, and three 25-pin D connectors. One of the three is a parallel interface, and the other two are serial ports. These "extras" are standard on the MAD-1. The phone plug socket is there to support a planned communications option that has not yet been released. I also found a connector on the bottom of the Computing Module labeled "Light Pen," although this plug is not mentioned anywhere in the manuals.

The Data Module has a power switch, a reset button, and a power connector for the video display. Perhaps the connector on my evaluation machine was damaged, but it seemed to me that the plug pulled out too easily and could disconnect itself if you slid the monitor around too much.

The plugs and cables on the MAD-1 bear witness to its careful design. The plugs and sockets have matching geometric shapes marked on them that make assembling the components a snap. The manual explains the process clearly, but I doubt anyone would need the manual for this step.

Under the Hood

Even without getting too technical, the MAD-1 has a number of interesting and important features inside its attractive packaging.

After you remove two screws from the back of a Module, you can easily slide the top back and lift it off to gain access to the machine's insides. You will notice that the

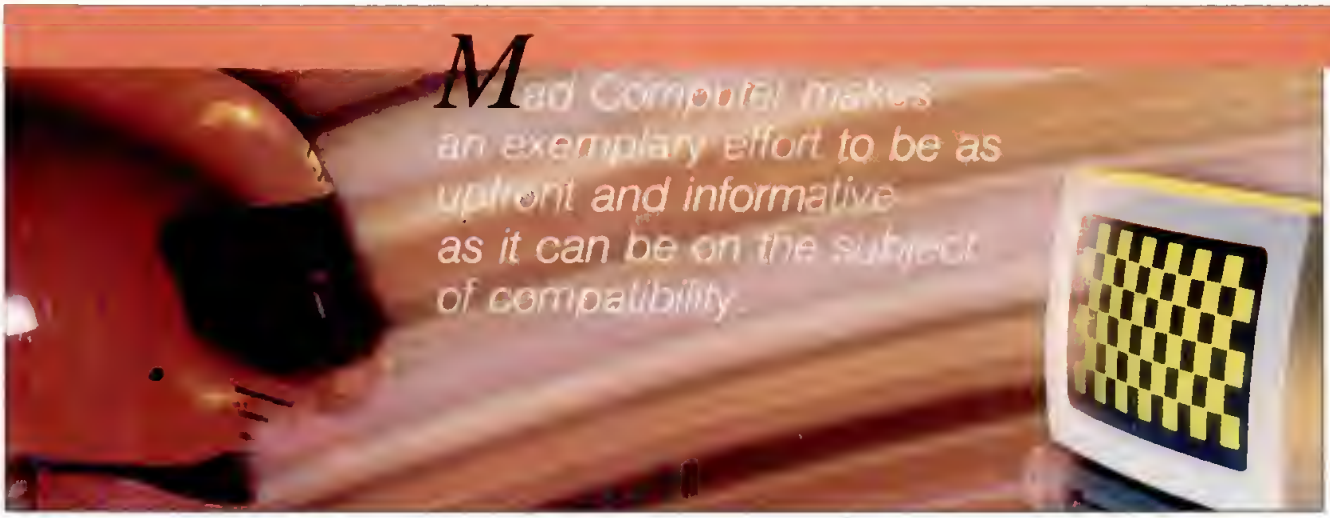
MAD-1
Mad Computer, Inc.
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Santa Clara, CA 95051
(408) 980-0840
List Price: $4,195 for dual floppy disk version; $6,295 for hard disk version.

CIRCLE 798 ON READER SERVICE CARD

Photography: Peter Angelo Simon

sides of the modules are all louvered and essentially open to the elements. While this design permits excellent ventilation (only the Data Module has a fan, and it is small and quiet), I would hesitate to install a MAD-1 in even a slightly unhospitable environment. Dust and airborne debris could easily coat the insides and cause heat and other problems.

According to the manual, you may use just about any card you wish, except memory expansion cards. (You also wouldn't add a clock/calendar card, since that function is built-in.) If you want the extra memory beyond 512K, you will have to fill the slot with Mad Computer's memory card. If you have a hard disk version of the MAD-1, however, this single slot will be filled already by the controller. (The hard disk is a 10-megabyte, half-height drive that takes the place of one floppy drive.)



The MAD-1 comes with 256K of memory. According to a company representative, the designers included this much memory because the MAD-1 is targeted as a "serious business machine." The motherboard will hold up to 512K in 128K increments. You can add a memory board (only available from Mad Computer) that adds up to 192K more, bringing the total usable memory to a whopping 704K (64K more than the IBM PC 640K maximum).

The MAD-1's 80186 microprocessor is in the same family as the IBM PC 8088, but it is of a more advanced design (see sidebar, "*The Fast One*"). Not only does this choice of processors mean that the MAD-1 has fewer chips on its motherboard than the PC, but it also means that the computer is faster for most applications (such as the BASIC prime number benchmark program).

The Computing Module also has one slot for an IBM PC-type add-on card.

Mad Computer has addressed this problem of not enough slots and will soon be offering an expansion module (no price set yet). It will not use the existing slot and will add four more. This lack of expansion space is the price you pay for such a sporty style; you are limited on headroom and may have to get a trailer to carry all the things you want. The expansion module "trailer" will not have a hard disk option, but if you add an external hard disk, third-party products should be compatible.

This raises the inevitable question, "How compatible is the MAD-1 with the IBM PC?" Mad Computer makes an exemplary effort to be as upfront and informative as it can be on the subject of compatibility. In the *User's Guide*, an appendix devoted to the issue discusses different types of compatibility. For example, it claims that MAD-1 is "media compatible" and that it has a compatible keyboard and character set. It will accept any IBM expansion cards except memory cards. The operating system, the manual says, is "substantially compatible," since it is a version of MS-DOS 2.0 written for the MAD-1. The manual claims some processor compatibility, but it points out that since the 80186 is faster (and "more reliable") than the 8088, there might be "timing problems for some PC programs" and that "programs that use instructions unique to the 8088 may or may not run on the MAD-1."

On the subject of software compatibility, the manual states that "any PC program that follows the operating system's rules is assured of running on the MAD-1." However, it says, if the program addresses the screen display directly, or relies on ROM instructions, it may not run. The manual lists about 50 programs that have been tested for compatibility, and the list includes *WordStar* (Version 3.2) *dBASE II* (Version 2.4) and Lotus' *1-2-3*. Originally, Mad Computer had planned on licensing its own versions of popular word processing and spreadsheet software packages; it has now canceled these plans. According to a company representative, since the machine is so highly PC-compatible, custom-label software is simply not needed.

(continued)

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Taking the MAD-1 for a Spin

Once thoroughly acquainted with the machine, I felt confident enough to turn it on and test it. First I had to take the monitor off its attractive perch atop the two other components and place it on the desk. (The machine I was testing was an early model, and the coil in the video display produced so large a magnetic field that it interfered with the disk drive if the monitor was sitting on the Data Module.)

I inserted the MS-DOS disk in the left-hand drive and closed the latch. The drives will not close without a disk inside, which makes it easier to tell when a drive is empty. I found it a bit of a reach around the back of the Data Module to get at the power switch. Once I turned it on, I was rewarded with the glow of the tasteful green power lights on the two Modules. Drive A: turned on, showing its green "in-use" light as it did so, and soon I saw a familiar MS-DOS notice and a question asking me about the date.

Since the MAD-I has a clock/calendar built in, the date was already correct, as was the time. This feature is just one more example of the attention given to detail in the design of the machine.

The video display is a pleasant amber. It is difficult for me to evaluate the quality of the display because the test machine was in dire need of adjustment. The characters were decidedly fuzzy down the left edge of the screen, and the lines of the display definitely sloped downhill to the right. The character set appeared to be very good, but I suggest you look at a properly set-up machine first to judge for yourself.

The double-sided, double-density disk drives are extremely quiet and seem to be fast. They format disks to the same 360K capacity as the IBM floppy drives do under DOS 2.0. Interestingly, when you load a disk into a drive and close the latch, the disk starts to spin. If you don't access the disk right away, it will continue to spin for a short time and then stop. Apparently, the designers assumed that users access disks soon after they mount them. By starting the disk spinning right away, they save time for that initial access. I thought this feature was a nice touch.

I made some copies of disks and found that the FORMAT command and the DISKCOPY commands work quickly and efficiently. The DISKCOPY utility will format a disk for you when you make a copy, so there is no need to format the disk first. I then tried to load *WordStar*, using the standard, off-the-shelf version. It loaded in just under 7 seconds, which is on a par with the IBM PC's time. It also ran without a hitch.

My next step was to try a BASIC program that was used earlier this year to benchmark the speeds of IBM PC compatibles (see "A Garden of Portables," *PC*, Volume 3 Number 6). This program produces prime numbers from 1 to 50. When I typed BASIC, I received a File Not Found error message. Incredulously, I looked at the directory of the MS-DOS disk and found that no BASIC was included. Thinking that perhaps a second disk containing the missing files had been lost, I called Mad Computer. "Oh no," came the response, "GWBASIC is available as an option." And it costs $195.

I finally obtained a disk with GWBASIC that worked fine. I found that IBM BASIC also worked. With its faster 80186 chip, the machine blasted through the program in a mere 38 seconds, a race car time nearly one-third less than that required by most other PC compatibles.

I also tried a variety of programs from *PC Disk Magazine*. They all ran flawlessly, except for those requiring a graphics display. According to the MAD-I manual, the circuitry for both monochrome and graphics displays are built-in, but you must get an optional "graphics kit" to take advantage of the graphics capability.

The Manuals

The MAD-I's high-tech design effort did not stop with the hardware. The two manuals come in the familiar boxed binders; the boxes and the binders share a bold

The Fast One

The 80186 is the faster, more advanced microprocessor many PC-compatible manufacturers have turned to for a marketing edge.

In 1978, Intel introduced the 8086, one of the first 16-bit microprocessors, and shortly after, the similar 8088, with an 8-bit data path and a lower price. IBM chose this cheaper chip for its new Personal Computer, and the rest is history.

The 8086 family now has at least four different chips, the 8086, the 8088, the 80186, and the 80188. Like the 8086, the 80186 has 16-bit internal and external data buses. It improves the original design by running a superset of the 8086 instruction set and requires about 20 fewer chips than a comparable 8086 design would. An 80186 running at a given clock rate should outperform an 8086 running at the same rate.

The 80188 is a similar improvement over the 8088. Like its forerunner, the 80188 has an 8-bit external data bus. Like the 80186, it has an enhanced instruction set and a higher level of integration so that it requires fewer supporting chips.

Mad Computer is not the only company to have chosen the 80186 for a PC-compatible computer. Tandy's TRS-80 Model 2000, the Pronto Series 16, and the new Mindset are all designed around the 80186. These four vary in their degree of compatibility with the IBM PC, a quality that cannot be measured by simply seeing what microprocessor is in the box. —A.P.

graphic design, but each manual has its own color stripe so you can match the binder with its box. Inside each manual, the chapters are separated by glossy graphics, all of which are variations on the same theme. The manuals' visual impact is unlike that of any others I have seen.

Mad Computer goes beyond making the manuals pretty. The text is easy to read and the authors use plenty of examples and illustrations. The *User's Guide* even lists the authors' names. The documentation seems so thoughtfully produced that it's only natural that the writers should be given credit for their contribution.

The User's Guide is organized so that you can read from start to finish and set up your computer as you go.

The *User's Guide* is organized logically so that you can read from start to finish and set up your computer as you go. You should have everything connected and running in short order and also learn something about the more detailed aspects of computing. This manual includes a chapter on what to do if the computer doesn't work correctly. It also has appendixes on MS-DOS messages and commands, technical notes, and the extensive discussion of the MAD-1's IBM PC compatibility. At the end, you will find a useful glossary and an index that seems to cover everything.

The other manual is a guide to MS-DOS 2.0. It covers the basic operating system concepts, files, and other disk-management topics. The bulk of the manual is a reference section explaining MS-DOS commands. It has chapters on DEBUG and EDLIN and appendixes with technical details on error messages, interrupts, and function calls. The index is apparently as thorough as the one in the *User's Guide*. The writing style in the MS-DOS manual is not quite up to the standard set by the *User's Guide*, but given its denser treatment of more technical subject matter, it still deserves high marks. I discovered one slightly unsettling omission, however. The command ERASE is available in this version of MS-DOS (as an equivalent to DELETE). The *User's Guide* documents this command, but the MS-DOS manual fails to mention it. I did not find any other omissions, but this one does raise lingering doubts.

The one complaint I have with the manuals is the way the pages are designed. They are long and skinny by usual standards: 6-x-9½ inches. The pages are laid out with a wide margin to one side, called a scholar's margin, which is used for section headings and user notes. Normally, these kinds of margins are on the outside of the pages, but in the MAD-1 manuals, they are all on the left side of the pages, which means the binder rings interfere with your note-taking on the right-hand pages. This is a small point; in general, the manuals are very good.

A Last Look Around

Like a sports car, the MAD-1 is an attractive, high-performance machine. Many extras that are considered luxury options on other computers are standard with the MAD-1. On the other hand, some features are quirky, and others (such as BASIC) are just plain missing. Expansion options are cramped, although the expansion module will help. The MAD-1 runs just about any software designed for the IBM PC (but not all) and can use expansion cards designed for the PC (such as networks, modems, and others).

Its price is comparable with a similarly outfitted IBM PC. Your decision is really between expansion slots and guaranteed software compatibility with the IBM, and high performance and good looks with the MAD-1. Mad Computer has made a strong case for choosing the sports model. ■

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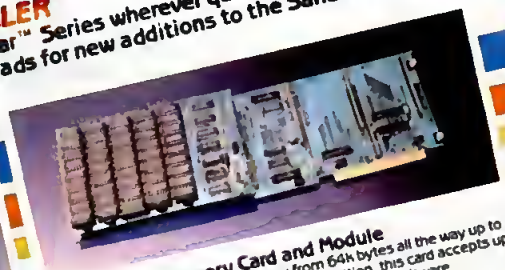
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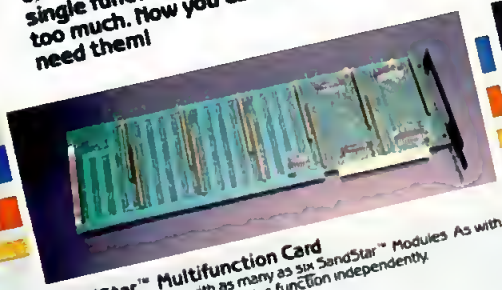
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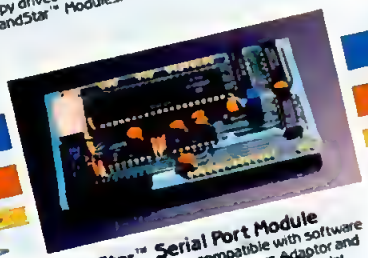
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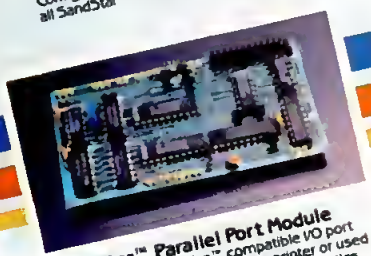
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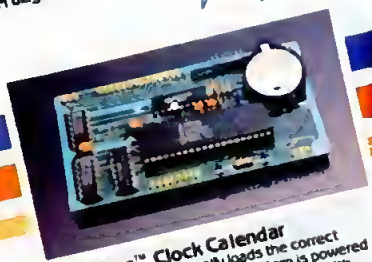
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Jack2 Sprints to the Fore

Business Solutions' new offering is off to an impressive start on the integrated software track. Though it may not outpace 1-2-3 in sales, it still finishes a winner.

The integrated software market keeps getting more crowded, but new products continue to muscle their way toward the top. Most of these offerings try to emulate Lotus' *1-2-3*, the integrated software leader, by centering their capabilities on spreadsheets. But *Jack2*, a novel new entrant from Business Solutions, Inc., is based instead upon a form, the electronic equivalent of a document, that would incorporate the functions of word processing, graphs, and spreadsheet data. Instead of integrating these functions as separate software entities, *Jack2* presents them as components in its flexible informational document.

Instead of switching environments, the *Jack2* user can simply insert any of the other functions into the text of the form. The fact that these various representations of data can coexist on the screen as a seamless whole, without the visual or intellectual distraction of windows, is *Jack2*'s principal distinguishing characteristic.

This is an alluring prospect, and *Jack2*'s backers have emphasized its potential with a series of highly publicized challenges against integrated software heavyweights, including *1-2-3* and Apple's Lisa system. Unsurprisingly, perhaps, *Jack2* has whipped the competition

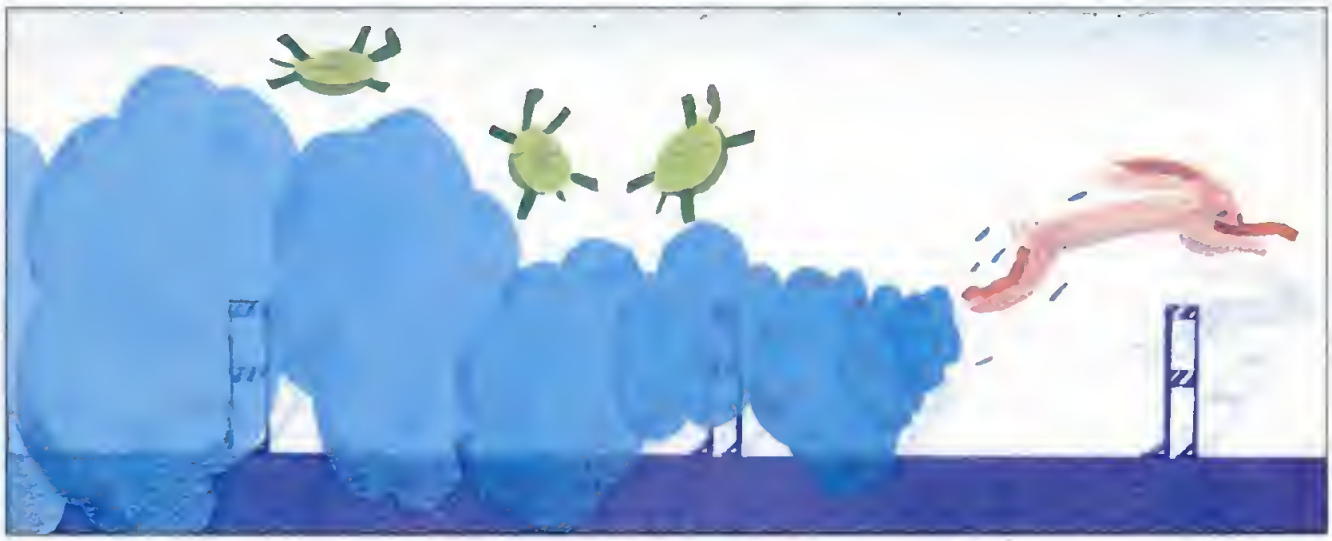


Illustration: Richard Osaka

in its own test. Our test, however, resulted in mixed conclusions. The package does indeed have many strengths—enough to guarantee it a comfortable niche in the marketplace. But it has shortcomings, too. Accordingly, *Jack2* is not for everyone. To find out why, let's take a closer look at this new challenger in the integrated software derby.

Jack2 requires two disk drives and 128K of memory in order to run on the PC. It can be installed on a hard disk with the standalone XT installer package included with the program. Business Solutions, Inc., plans to offer an XT version of *Jack2* in the future. The compact *Jack2* package includes a disk of sample files and a *Tasks & Applications* manual that provides clear explanations of how to apply the software to a variety of common situations. Sample applications include checkbook balancing, check printing, product sales and salesperson performance, form-letter processing, projection, and scheduling.

As mentioned, with *Jack2*, various representations of data can appear on a single form. If you were manually composing a document that incorporated text, a numeric table, and a bar chart, you would not be restricted to writing your text on lined paper, your table on a green spreadsheet, and your chart on graph paper; you would combine them into a single form (see Figure 1). The same is true with *Jack2*. Its method of integration is intuitive, powerful, and pleasing.

Another strength of the *Jack2* package is its visual design. When you load the software, the screen displays a drawing of a desktop computer, which holds your attention while *Jack2* migrates from the program disk to memory. You need at least two disk drives for *Jack2*, and the program disk must remain in the booting drive during the *Jack2* session.

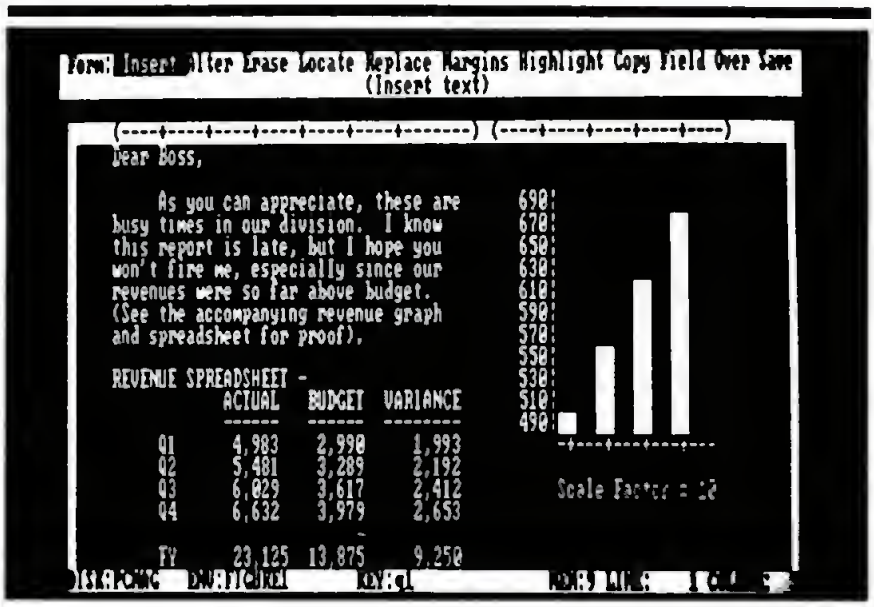


Figure 1: *Various representations of data, including text, numeric table, and bar chart, can be integrated on a* Jack2 *screen.*

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The Disk Screen

After the initial boot sequence, *Jack2* presents the Disk screen. The Disk screen displays icons representing the disks that currently reside in the drives. *Jack2* assigns names to the disks that you use to store *Jack2* forms. Figure 2 shows the Disk screen with two icons representing the *Jack2* program disk residing in the first drive and a data disk, named PCMAG, housed in the second drive.

The top section of the display contains the command line of the Disk screen. These commands permit you to copy one disk to another, erase or rename a disk, print a disk catalog, or configure *Jack2* for your particular hardware setup. There is also a ZOOM command that allows you to focus on the files contained within a single disk.

Notice the highlight on the ZOOM command in Figure 2 and the hint line below it describing the command being highlighted. Notice also the arrow pointing to the PCMAG disk. You can examine a particular disk by shifting the arrow to that disk and invoking the ZOOM command. Choosing a command involves pressing the space bar until the highlight eclipses the command you want, and then pressing the Enter key. Alternatively, you can type the first letter of the command.

Selecting ZOOM brings you to another screen of icons, the Envelope screen (see Figure 3). Like the Disk screen, the Envelope screen consists of a command line, a hint line, and a lineup of icons. The icons in this case are envelopes, *Jack2*'s equivalent of files. Any function or combination of functions, whether word processing, database, spreadsheet, or graphics, can be contained in one envelope. A disk icon on the right side of the screen shows which disk has been opened for inspection by the ZOOM command and how much disk space has been used up by the envelopes it contains. A disk can hold as many as 50 envelopes.

The Envelope screen can display up to six envelopes at a time. The arrow keys

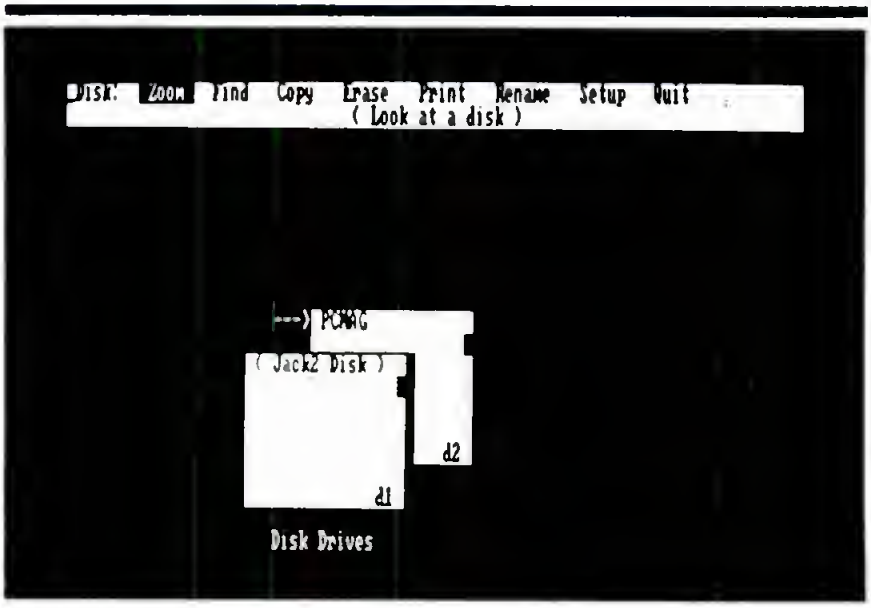


Figure 2: *This Disk screen displays two icons representing the* Jack2 *program disk and a data disk named PCMAG. Note the highlight on the ZOOM command.*

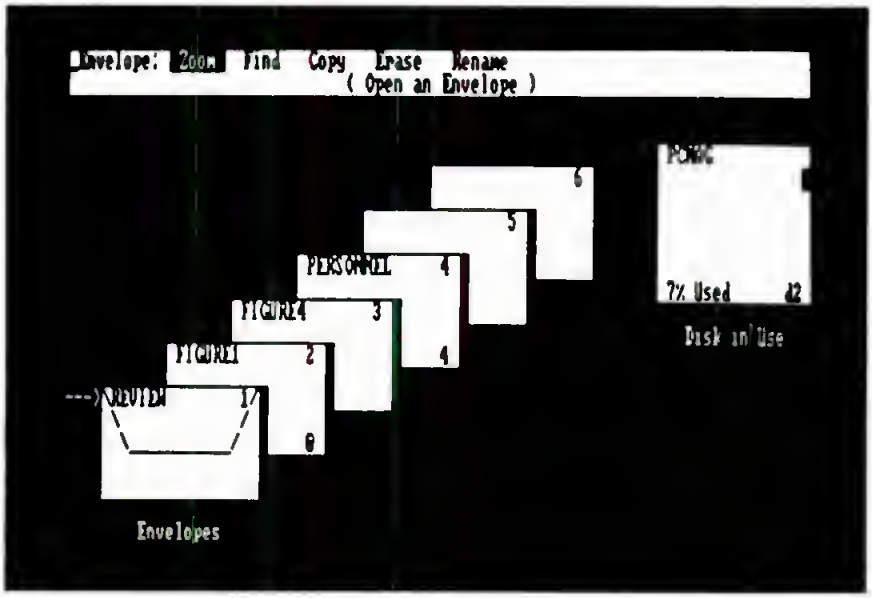


Figure 3: *Envelope icons such as these shown on an Envelope screen are* Jack2*'s equivalent of files. The screen can display a maximum of six such envelopes.*

permit you to scroll up and down the envelope lineup to view any 6 out of the maximum 50 envelopes. Here, too, there is a ZOOM command to open an envelope for inspection. You also can copy an envelope to another envelope on the same disk or to an envelope on another disk, erase or rename an envelope, or find a disk in the lineup by name, instead of by pointing.

You will notice that only some of the envelopes in Figure 3 have names on top. Blank envelopes are used to create new files or to store copies of existing files. Using the ZOOM command with an existing envelope accesses that file; using it with a blank envelope opens up a new file. ZOOM is one of several commands that appear in several screens and function similarly in each. Using the same command to perform the same operation in different contexts is one way *Jack2* achieves integration.

Using the ZOOM command to open an envelope invokes the Contents screen, which exhibits an icon lineup of the form and records contained in the envelope. If the envelope contains database records, you can point to a record and invoke the ZOOM command to inspect its contents. To create a new form in a new envelope, simply point to the form icon that appears on the Contents screen and use the ZOOM command. The Form screen on which you enter your document will then appear (see Figure 4).

You can use the Form screen for word processing or for any other function. *Jack2*'s word processing is one of its most capable features. Using the same type of command menu selection process described for the other screens, you can insert, alter, and erase text, locate occurrences of a string of characters within text, find and replace all or selected occurrences of a set of characters, copy and move text within and outside the envelope, and specify margins, tabs, and page-formatting options for all or part of the document.

The MARGIN command inserts a margin line in any part of the text. For example, you can create a document with one section that is 80 characters wide and justified on the left and right, another section that is 65 characters wide and centered, and another section that contains two columns of text side by side, magazine style. The maximum width for a form is 255 characters.

The Form screen also includes a HIGHLIGHT command. Text on the screen and in print can be emphasized in bold print, underscored, or both. The software includes printer configuration drivers for Epson FX, MX, and RX models, IBM

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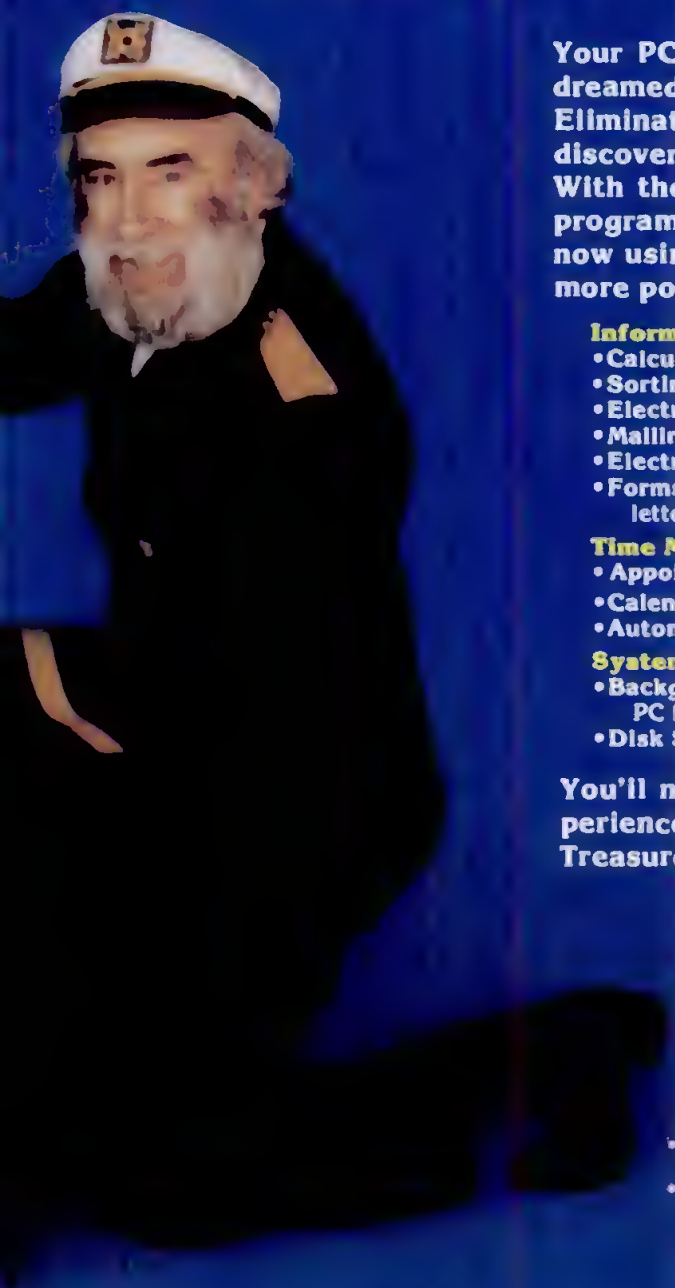
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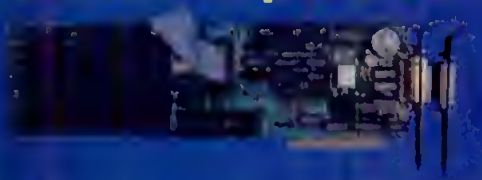
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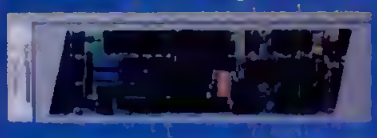
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CIRCLE 501 ON READER SERVICE CARD

Graphics, Okidata 84/92/83, NEC 3550, C. Itoh Printmaster F10-55, Diablo 630 ECS, and Brother HR15/25. The software can also be used to configure *Jack2* for other printers.

In many ways, *Jack2*'s word processing is better than many dedicated word processors. It is easy to use, highly visual, and delightfully fast. Each envelope can store up to 9 pages of text, and each disk up to 90 pages.

Formal Integration

Jack2's other functions—database, spreadsheet, and graphics—may be incorporated onto the Form screen using the FIELD command. This involves positioning the cursor where you want to place a field, and then selecting the appropriate FIELD command to indicate an item in a database record, a cell in a spreadsheet, or a graph.

Each field has a name, selected by the user, and a type (Box, Variable, Row, Column, or Graph). The type will depend on whether you want a spreadsheet, database, or graph, so you never actually have to specify what function you'll be using. Take, for example, a personnel database containing the name, address, phone number, and salary of each employee in an organization. To create this database, you would begin by zooming into a blank form and typing the names of the data fields on the form. Then, you would insert Box fields to hold the form's data. Specifying the Box field type tells *Jack2* that this is a database file. This form would serve as a template for your data records. You can create records by filling out a form for each employee, similar to the one depicted in Figure 5.

> The spreadsheet, while sporting some convenient features, pales in comparison to the major integrated packages on the market.

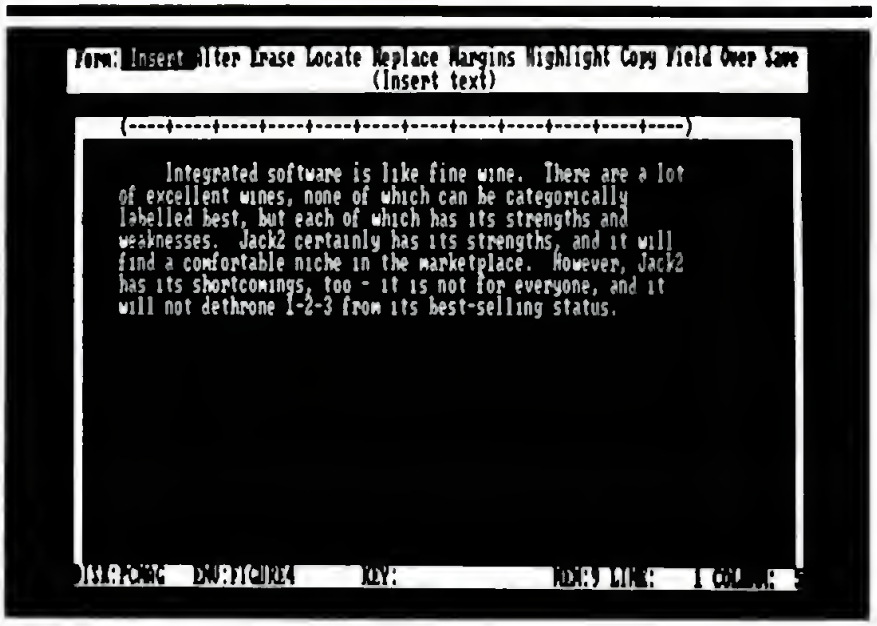


Figure 4: *Documents are entered on the Form screen, which can be used for word processing and other* Jack2 *functions.*

Once you have entered some records into the database, the Contents screen displays record icons in its icon lineup (see Figure 6), along with a form icon that represents the electronic form you used as a template for your data entry. There is also a blank record icon, indicated by an arrow. To fill out a form of data, you simply point the arrow to the blank record and use the ZOOM command. A blank form ready for data entry will appear on screen. Selecting a particular record for viewing or editing requires the same process: simply point to the record you want to see and invoke the ZOOM command.

Jack2 also allows you to select a subset of the database by specifying criteria with a command. For example, you can instruct *Jack2* to temporarily select the records of people whose salary is greater than $25,000, or people whose names begin with the letter *A*. You may then choose to have any further database commands apply exclusively to the selected group, or to the unselected group. Alternatively, you may select a data subset manually by pointing to the records you want to include in the subset.

You may sort a database on up to three field keys using a sort command. Thus, you could get a printout of the database sorted by salary and then further sorted within salary by name, and sorted again within name by some other field.

The integration between database and word processing is nicely orchestrated. You can create one envelope with a form containing a document, such as a form letter to be sent to employees. In this document you would embed a field for the employee's address, and after the word *Dear* in the salutation, insert a field for the employee's name. If you assign these items the same names as their corresponding fields in the personnel database, you can create personalized letters for each of the employees by copying the records of the personnel envelope to the form-letter envelope (using the Contents screen COPY command). You could even send a particular form letter to a specific category



Figure 5: *A template for personnel records containing vital employee information can be created with* Jack2 *and included in a database.*

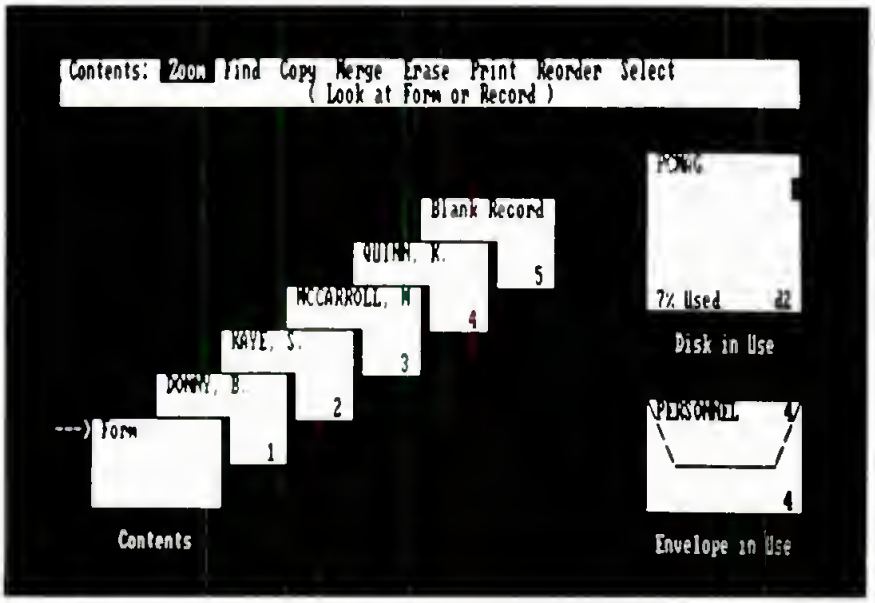


Figure 6: *Once the personnel records have been entered into the database, the Contents screen displays them in its icon lineup.*

of employees.

There are some important limitations to the database, however. You cannot derive subtotals or summaries of the database's contents. Consequently, you would not be able automatically to total the company's weekly salary expense using the personnel database. Moreover, there is very little flexibility in printing reports, unless you are willing to print the exact contents of records as they appear in the form. Business Solutions is marketing an additional product, *Jack2 Report*, to answer these needs, but at additional cost.

Spreadsheet Limitations

The spreadsheet, while sporting some convenient features, pales in comparison to the major integrated packages on the market. In some packages, the spreadsheet appears automatically—using it does not require an initial setup. In *Jack2*, you have to create the spreadsheet on the form by using the column and row field types. When specifying a column field, you must tell *Jack2* how many spaces wide the column should be and how many cells long. A row would need similar dimensional specifications.

If you wanted to develop a quarterly spreadsheet of a company's 12 categories of revenue, you would have to create either 4 separate column fields or 12 separate row fields. For each field, you would have to move the cursor to a position on the form and invoke the FIELD command to assign the field a name and type (column or row). Of course, if you will be using software primarily to do spreadsheets, you won't want to be bothered with this type of setup.

On the other hand, the ability to assign names to columns and rows is an advantage when creating formulas. Suppose you wanted to add a fifth column to add up the revenues for four quarters. If you had named each of the quarter columns (Quarter1, Quarter2, and so on) then a Full Year column could be computed automatically with a "calc rule": Quarter1+Quarter2+Quarter3+Quarter4. The entire Full Year column will be derived automatically with this formula.

In many spreadsheet packages, columns and rows cannot have names. Instead, their component cells have column-row addresses, such as A1 or J5. Storing a formula in an entire column in these packages is a two-step process: You have to enter the formula in the first cell of the column and then use a command to replicate the formula to the other cells of the column. *Jack2* circumvents the need for a replication command and a two-step formula assignment.

Jack2's spreadsheet capacity is limited.

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JACK2

A spreadsheet cannot exceed 255 characters in width. Moreover, having more than 128K of memory in your computer will not provide you with more spreadsheet capacity. Since spreadsheet applications are memory-intensive, a user may well bump into the 128K barrier, especially if a large spreadsheet is being combined with a document on the same form.

Many of the capabilities of the more powerful spreadsheets are absent from *Jack2*. *Jack2* incorporates a few financial functions but no date arithmetic functions.

> Where Jack2 really fills the gap is in the areas of word processing, file management, and integration. It makes integrated software available to a deserving segment of the user population.

There is no cell protection and no facility for automating applications with command macros. You cannot fix title lines so that they do not disappear when the spreadsheet is scrolled, and there is no method for formatting values throughout the spreadsheet in a single step. To uniformly change the format or width of your entire spreadsheet, you would have to alter each field individually, in separate steps. If you want to transfer files between *Jack2* and other programs (such as DIF or ASCII files), you will have to purchase the companion package, *Jack2 Utility*. This is clearly not a spreadsheet for number crunchers.

Like the spreadsheet, the graphics function is not full-featured. The main strength of *Jack2* graphics is the program's ability to display graphs and text on the same screen. A graph can be created by moving the pointer to the spot where you want it to appear. Then you create a Graph type field and tell *Jack2* which field to chart and whether to plot a bar or line graph. The graph will appear in the specified place on the screen and in the document. An entire form—text, spreadsheet, charts, and all—can be combined in a single document and then reproduced on a printout.

However, outside of integration and simplicity, *Jack2*'s graphics are weak. *Jack2* does not take advantage of color and provides only two types of charts, line and bar. Moreover, the line graph is not really a line graph—it is a point graph. The plotted points are connected neither on screen nor in hardcopy. According to the manual, "This is done to prevent a loss of accuracy in the curve." Does your hand draw more accurately than your graphics printer? How many people invest in a graphics printer in order to draw line graphs by hand?

The software is limited in certain specific ways. It does not automatically supply a legend to identify what fields the bars or lines represent. Nor does it automatically label axes or center graph titles. Lack of pen plotter support makes this package unsatisfactory for presentation-quality graphics.

Despite these flaws, *Jack2* is, on the whole, a well-conceived, well-executed program. It will not suit everyone's needs, but then neither will the current leaders in the under-$500 integrated market. Number crunchers and power users may legitimately want a package with a better spreadsheet and more flexible (albeit complex) features.

Where *Jack2* really fills the gap is in the areas of word processing, file management, and integration. It speaks well for Business Solutions that the richness of integrated software is available to a deserving segment of the user population through *Jack2*. ■



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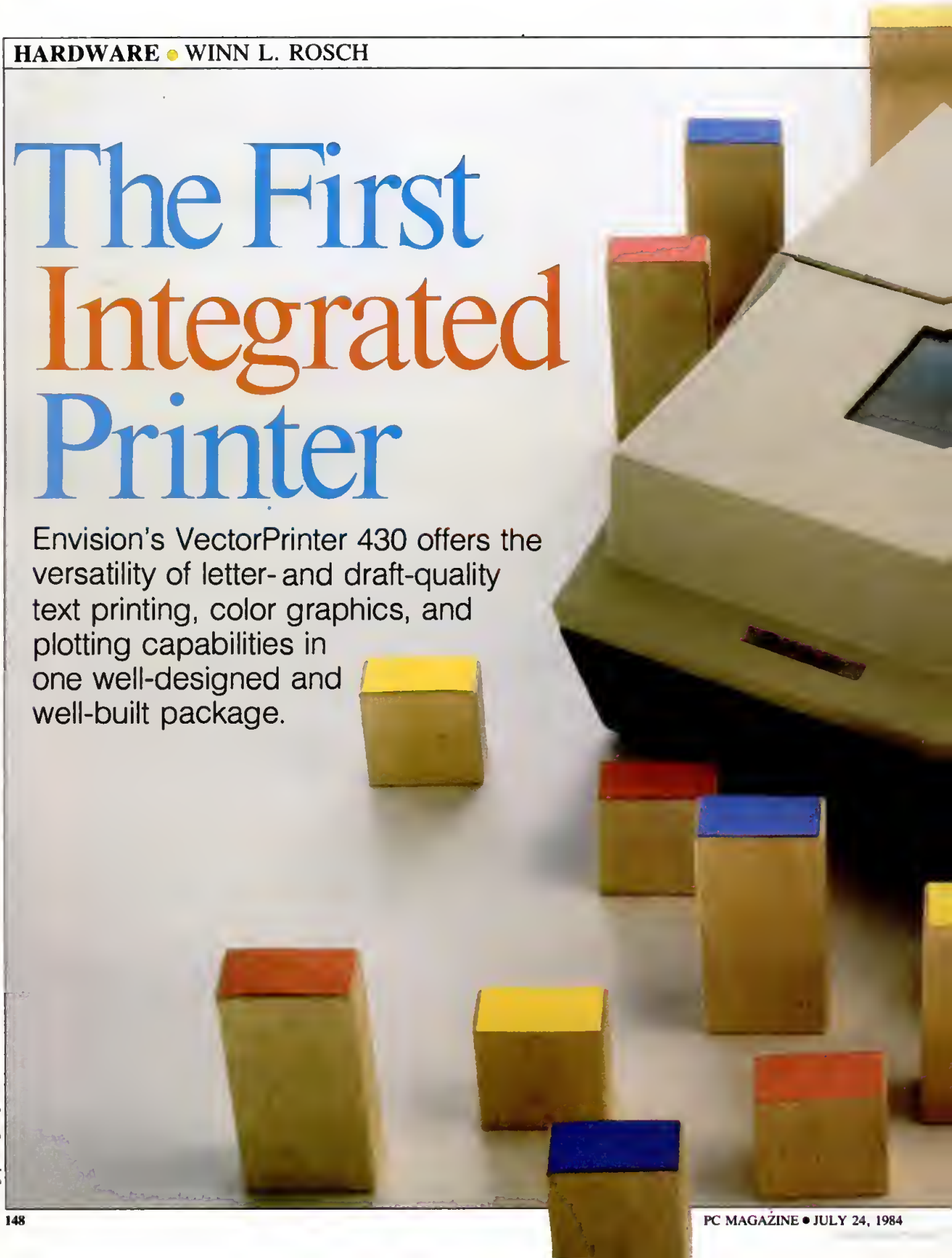
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The First Integrated Printer

Envision's VectorPrinter 430 offers the versatility of letter- and draft-quality text printing, color graphics, and plotting capabilities in one well-designed and well-built package.



Photograph: Greg Sclight


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Envision's VectorPrinter 430 is a big beige box with a microprocessor mind of its own—it may be the world's first piece of integrated hardware. It puts letter- and draft-quality text on paper along with color graphics and plotting capability.

Integrated software, where one package does everything so you don't have to memorize half a dozen manuals and hire a referee to make sure that your word processor gets along with your spreadsheet, is the latest computing rage. The hardware world, however, still seems lost in the age when every machine had a purpose, and every purpose had a separate machine.

But not the Envision VectorPrinter 430. If I might coin a term, the VectorPrinter promises to be an integrated printing system. The VectorPrinter is a worthy attempt to combine every possible means of putting ideas onto paper into one comprehensive (read: big and heavy) package. Covering the range from high-speed dot matrix to near letter quality, the VectorPrinter even tosses in multicolor graphics and the capability to emulate a multipen plotter for plying through charts, graphs, and transparencies. You could spend months exploring all the variations on the printing theme locked in its circuitry.

In truth, do-everything hardware is nothing new. You likely have a do-everything machine already: your computer. With the right software, your PC can handle almost any chore, as long as it remains in the Kantian realm of pure reason. By itself, the PC's mechanical abilities are—let's be nice—unextraordinary.

The VectorPrinter 430 can print anything in much the same way your PC can think anything—by being a computer. Inside the VectorPrinter a complete microcomputer shares dorm space with the printing mechanism. In fact, the VectorPrinter has more computing power than many personal computers. Controlling printhead, paper, and ribbon motions is an 8088 microprocessor just like the one lurking inside your PC. The printer also contains a full 128 kilobytes of RAM.

At its mechanical heart, the VectorPrinter is a robust, dot matrix, impact, plain-paper pecker. It differs from the common mien of dot matrix printers in its brutish size and its calligraphic artistry. Neither speed demon nor slowpoke, it's a Renaissance man among journeymen. You can use its diverse talents to create your own masterpieces.

VectorPrinter 430
Envision Technology, Inc.
631 River Oaks Pkwy.
San Jose, CA 95134
(408) 946-9755
List Price: $3,495

CIRCLE 799 ON READER SERVICE CARD

The Machine

The package looks and feels impressive: big, square, a heavyweight. A central piano hinge allows lifting both the front and rear covers. A long row of membrane-switch pushbuttons lies along the front panel, partly covered by the front lid. These switches communicate your demands directly to the VectorPrinter's internal microprocessor, which also listens to and understands escape sequences and other control codes.

Also under the front half of the lid is the printhead chamber, which is made of spotless aluminum lined with foam to absorb sound. The VectorPrinter is thus among the quietest impact rattlers around (roughly 72 dB at 1 meter, approximately the loudness of a normal conversation). Robust motors and equally robust cogged belts drive both the long (to accommodate 15-inch paper) platen and the printhead.

The rear cover hides the bidirectional tractor. This means that paper can be routed through the machine without ever becoming visible; the printer could sit unrecognized on a tabletop.

The Rube Goldberg printhead itself is a clever but complex stack of four separate ribbons allowing instant color selection. A pallette of eight hues created from four ribbons is available. Each ribbon is in its own cartridge, so when you run out of one color, you need only replace one ribbon. The cartridges slide easily into place, and the machine automatically sorts through the stack upon your command.

Changes

This is not my first look at the VectorPrinter 430. I examined an earlier unit as one of "A Plentitude of Printers" (*PC*, Volume 2 Number 5). Partly in reaction to that critique, the VectorPrinter has been slightly modified. A few potential problems have been solved, and the VectorPrinter has been made even more PC compatible and probably even more useful.

After last year's review criticized the printhead temperature, Envision's engineers added a hefty heatsink to the mechanism. While the original VectorPrinter had the second-highest printhead temperatures measured in last year's test (it rose 39 degrees F in 5 minutes), after half an hour of continuous work, the new printhead measured a modest 12 degrees F increase. That's commendable because lower temperatures extend printhead life.

I also criticized the surfeit of tie-wraps requiring removal before a new VectorPrinter could be operated. Worse, some of the tie-wraps were supposed to remain in place to keep the proliferation of wires under control, while others had to be removed. Envision solved that problem with a modest redesign to eliminate the shipping tie-wraps.

Alas, the VectorPrinter still resembles a kit—you must mount the platen roller and the two rubber belts that drive it and the tractor. Don't worry, it's not much more than a 5-minute chore, and you're likely to need to do it only once. According to Envision, the platen roller is packed apart from the rest of the printer to keep it from getting bent during shipping.

You have your choice of where to plug the Envision 430 into your PC—both serial and parallel input ports are standard. The serial interface is a pleasure to use because there are no DIP switches to set.

All your favorite parameters, including speed, word length, and parity, can be set using the front-panel membrane switches. Both a standard Centronic parallel connector (not IBM style, so you'll need an adapter cable to use it) and a DB-25 connector for the serial port are mounted on the rear of the printer.



An example of a full-eight-color, solid background, screen dump, printed on the VectorPrinter 430.

The Printer

The VectorPrinter 430's computing power will primarily be used for plain-vanilla printing, and in that regard it's a delightful, if not wonderful, performer. It falls into that vague class of dot matrix impact machines with aspirations of generating true letter quality text. And it comes close to doing just that. In last year's comparison of top-of-the-line printers, the VectorPrinter's print quality was rated the best.

Part of the explanation for the 430's sleek and chic typography is its ability to use mylar film-ribbon cartridges as well as inked-cloth ribbons. The precise, dark-black dots make each letter and number razor sharp in any of the machine's low-speed/high-quality modes. It's too bad that the ribbon cartridges do not match those of any of the more popular machines, which means that you may be locked into a single source of supply.

As in any matter of aesthetics, an evaluation of the look of VectorPrinter's standard typeface is entirely subjective. My personal taste rates the sharp, clear, but sans serif typefont as indifferent (see Figure 1). It looks fine, but I am reluctant to use it for manuscripts and business correspondence because it varies so widely from the typewriter-derived norm expected by editors and executives.

Perhaps so that finicky folks like me (and probably you) will not be completely dissatisfied, Envision allows you to make any of several other faces in the VectorPrinter's permanent memory the default face merely by pressing a button. Like all commands to set up the machine, the type font default can be set in EEPROM from the front panel and need not be reset whenever you turn the power off.

The type font selection is wide, indeed. Besides standard 10-pitch, there are 12- and 18-pitch versions of the default typeface (see Figure 2). The excellent clarity and readability of the 18-pitch characters justifies Envision's choice of the sans serif type font as a default. Two additional faces, Italics and Bold (see Figures 3 and 4), are fully serifed, and either would make a good choice as your primary font for letters and manuscripts. Slide in a black fabric ribbon and the Bold typeface looks exactly like a typewriter's work.

(continued)

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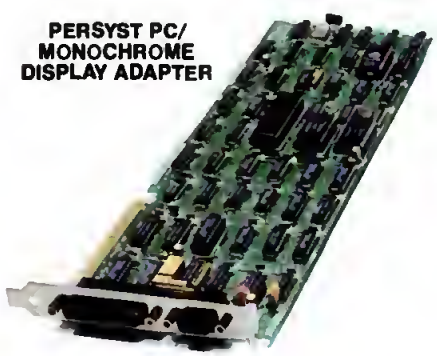
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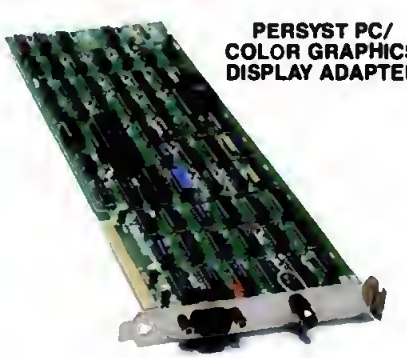
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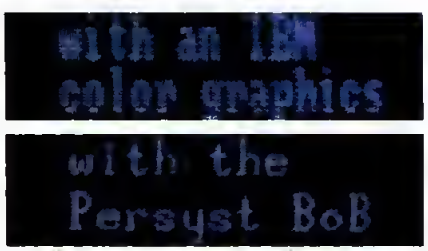
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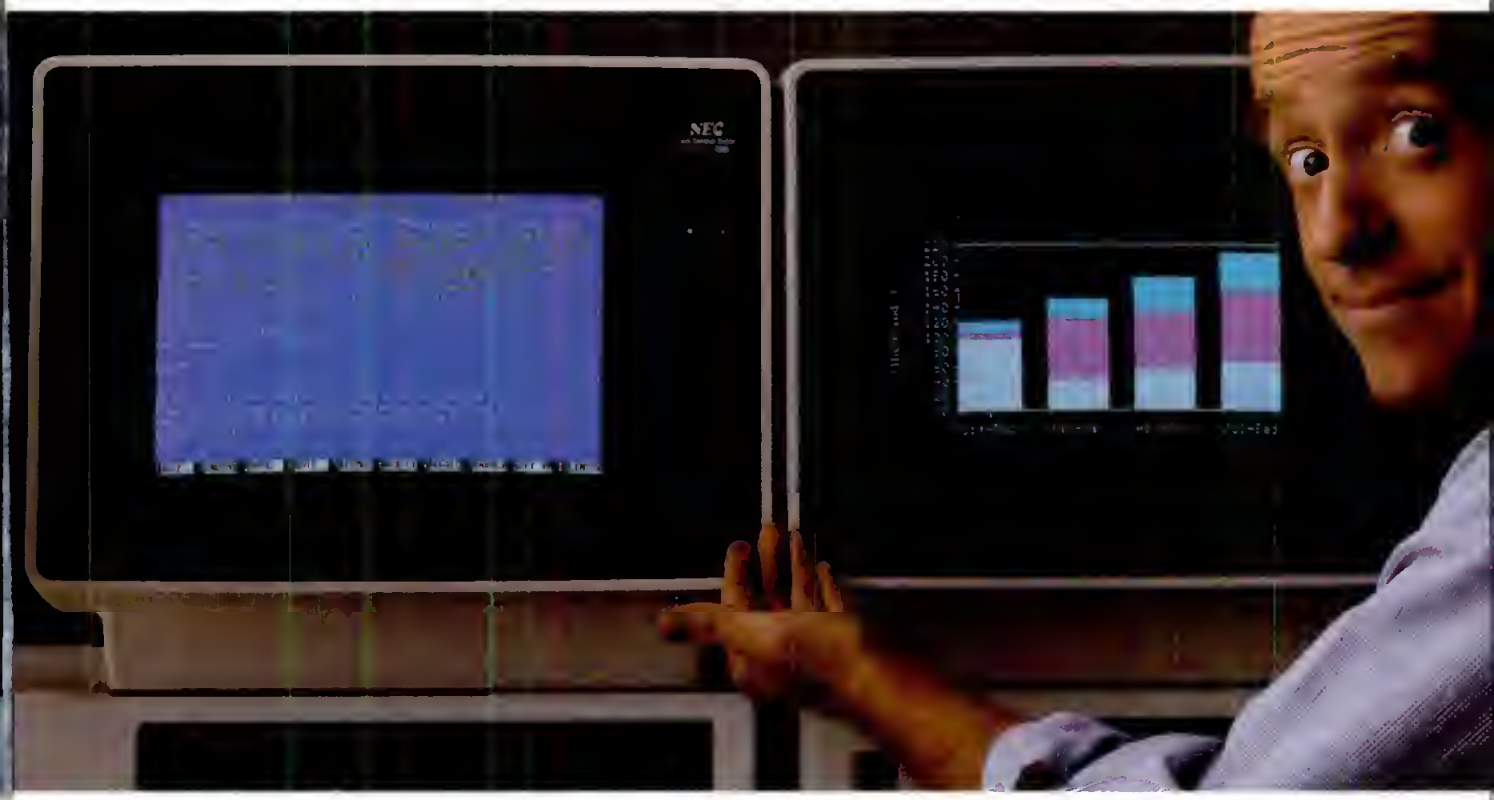
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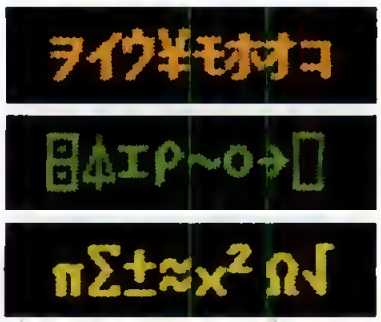
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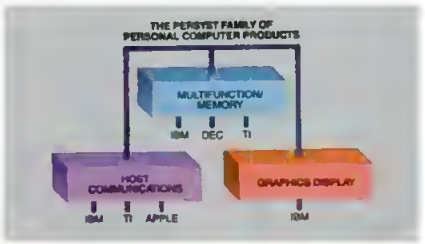
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CIRCLE 512 ON READER SERVICE CARD

The 430's Orator typeface is more readable than most of that family, since the characters are wider than normal narrow Orator (see Figure 5). My favorite font, however, is Script (see Figure 6). Proportionally spaced, it looks much better than typewriter script does. It's readable, good-looking, and a step above the script faces most dot matrix machines make you pay extra for.

If none of Envision's typeface choices please you, any typeface you want can be downloaded into the VectorPrinter, including Japanese and probably even hieroglyphics.

The only disappointments in VectorPrinter's print quality are the high-speed, draft-quality type fonts (see Figure 7). The 18-wire printhead forms good character shapes, but the small wires leave too much white space around each dot, making the characters harder to read than most high-speed matrix output. Nor is the VectorPrinter a true high-speed performer; at best it isn't even twice as fast as the standard IBM Graphics Printer.

Beyond Plain Text

If high-quality printing is not enough, the VectorPrinter offers the additional benefit of understanding (and putting on paper) most of IBM's extended character set. You can do nongraphic screen dumps and expect all of IBM's block-graphic characters to print perfectly, just as if you had an official IBM printer.

I discovered that in bidirectional printing mode, continuous vertical lines in the IBM graphics set assumed a somewhat wavy texture from imperfect registration of alternating dot-rows. In cases demanding maximum print quality, however, the VectorPrinter can be set to print in one direction only.

Alas, the VectorPrinter's PC-compatibility is not complete. The command set IBM chose for its official printers doesn't quite match the one the rest of the paper-peckers in the world use, and Envision has opted for the overall industry standard rather than IBM's.

```
This is an example of the print quality of the Envision 430.
The font shown is called Standard 10.
This is an example of the print quality of the Envision 430.
The font shown is called Standard 10.
```

Figure 1: *A sample of the VectorPrinter 430's standard, default typeface.*

```
This is an example of the print quality of the Envision 430.
The font shown is called Standard 18.
This is an example of the print quality of the Envision 430.
The font shown is called Standard 18.
```

Figure 2: *A sample of the 18-pitch version of the VectorPrinter 430's standard typeface.*

```
This is an example of the print quality of the Envision 430.
The font shown is called Italics.
This is an example of the print quality of the Envision 430.
The font shown is called Italics.
```

Figure 3: *A sample of the VectorPrinter 430's italics typeface.*

You probably won't notice any problems in text modes, but load GRAPHICS.COM and try a screen dump by pressing the Shift and PrtSc keys, and you're likely to be quite surprised. Every time I tried it, the VectorPrinter developed a large appetite for paper and executed a seemingly endless string of form feeds. I don't know whether it was indeed endless because I switched the machine off (the only way I could reset it), to avoid spewing reams of virgin white sulfate surfaces directly into the dustbin. Luckily, this is not really a problem once you understand the VectorPrinter's graphic preferences—its software was designed to work specifically with the Plantronics color graphics board.

When I tried using the VectorPrinter for plain text with *WordStar*, I was warmed by generally favorable results. The VectorPrinter boasts a Diablo 630 emulation mode, which means that when you install your word processor as if you were using a Diablo 630, almost all of the program's printer commands will elicit their proper effects.

When I dashed out documents with the VectorPrinter masquerading as a Diablo, I ran into but one problem: The 430 buffers text in lines rather than characters, and it must receive a carriage-return command before it will type the line. Normally, every line *WordStar* sends to a printer does end with a carriage return, so for the bulk of a document there is no problem. The last thing that *WordStar* seems to send out the printer port, however, is a lonely formfeed command telling the printer to advance the paper up to the top of the next sheet. Apparently, no carriage return follows that final formfeed because the VectorPrinter invariably stopped abruptly after that last full line, and it would not formfeed to the top of the next sheet until it received a carriage-return command—usually after the first line of the next document was sent to it.

The pages are still properly separated, but the last thing you print may require you to poke the formfeed button to bring everything to a proper finale—disconcerting, but not a big problem.

Envision denied that the VectorPrinter had any problem with *WordStar* at all, suggesting that my use of a parallel port

might be causing the problem. Using a serial port, a different version of *WordStar*, and a different computer did not change the observed effect.

More frustrating is the plethora of VectorPrinter commands—multicolors and multifont—that you probably won't have access to through your word processor. (Of course, that's your software's fault, not the printer's.) You can send software commands through BASIC (or whatever), or you can change the most-used settings by massaging the membrane switches on the front panel. Just pull the VectorPrinter off-line, poke a few commands into its control panel, and resume your printing chore. Like other matrix printers, you can program the VectorPrinter to change nearly every printing parameter, including the most minute moves of the printhead. Variable line spacing and even proportionally spaced text are no problem.

Paper Shredder

Because the VectorPrinter uses a great big typewriter-like rubber platen, it easily handles both single sheets and continuous form paper. My first try at loading tractor-feed fanfold paper, however, met with disaster. The machine had a tendency to rip the paper into smaller shreds than I would normally want. Under my misdirection, the VectorPrinter unperfed the tractor-feed edges of dozens of pages between the first tractor and platen—even after I foresook my manhood and read the directions. My second try went easier, and after the third I could load paper quickly and almost painlessly. I needed only to master the unusual mechanism.

Perhaps the most bothersome aspect of paper loading is the absence of a platen knob to spin the first sheet of paper through the machine. The VectorPrinter requires you to advance the first sheet of paper through the threading path by grabbing hold of the platen drive belt and using it to roll the platen.

Although continuous-form paper can be fed into the VectorPrinter either from the rear or through the bottom, bottom-feed engages the tractor only as it is leaving the printer, turning the bidirectional tractor into a unidirectional mechanism. That transformation might become upsetting when you discover that the quickest way to print a picture is to dot an entire sheet in one color, change ribbons, back up the paper, and print it over again. The tractor mechanism can back up continuous paper only with the rear paper feed.

To ease the otherwise acrobatic chore of loading single sheets, the VectorPrinter offers a special single-sheet mode in which you need only lift the rear cover, slide the paper in place, and press a front panel button. The microprocessor takes over and rolls the paper to its proper printing position. Alas, the quicker color printing method is not possible for the full length of single sheets.

Although the VectorPrinter is not directly compatible with the PC dot-addressable graphics commands, all it takes is a little software to tum the proper tricks. Envision supplied me with a load-once-per-boot program that did the trick and brought graphic screen prints to life.

Plantronics Support

Because the VectorPrinter's capabilities go beyond standard PC fare, Envision has chosen to support the Plantronics graphics board rather than the standard IBM Color Graphics Adaptor. I discovered the Envision program works marvelously with the Plantronics and even provides some results with the IBM board.

My adventures with the IBM board were interesting, to say the least. The VectorPrinter tried hard to give me perfect graphic screen dumps—too hard. I played turtle with Logo and drew a rather elaborate figure on a black background and pressed the Shift/PrtSc key combination. The VectorPrinter rattled to life and pecked out a near-perfect replica of the

```
This is an example of the print quality of the Envision 430.
The font shown is called Bold.
This is an example of the print quality of the Envision 430.
The font shown is called Bold.
```

Figure 4: *A sample of the VectorPrinter 430's bold typeface.*

```
THIS IS AN EXAMPLE OF THE PRINT QUALITY OF THE ENVISION 430.
THE FONT SHOWN IS CALLED ORATOR.
THIS IS AN EXAMPLE OF THE PRINT QUALITY OF THE ENVISION 430.
THE FONT SHOWN IS CALLED ORATOR.
```

Figure 5: *A sample of the VectorPrinter 430's Orotor typeface.*

```
This is an example of the print quality of the Envision 430.
The font shown is called Script.
This is an example of the print quality of the Envision 430.
The font shown is called Script.
```

Figure 6: *A sample of the VectorPrinter 430's script typeface.*

```
This is an example of the print quality of the Envision 430.
The font shown is called High Speed 10.
This is an example of the print quality of the Envision 430.
The font shown is called High Speed 10.
```

Figure 7: *A sample of the VectorPrinter 430's high-speed, draft-quality typeface.*

screen, white and magenta on black. But its little hammers covered every square inch of the paper with heavy black ink.

The demo software I received allows you to alter the VectorPrinter's interpretation of on-screen colors so that you don't have to churn through a complete black ribbon for a single screen dump. They also supplied a series of good-looking computer graphics which used the full Plantronics color pallette. Once the image was on the screen, Shift/PrtSc gave good on-paper copies of the video display. Color blending varied with the type of ribbons used. Film-ribbon inks, in general, are more opaque and blend less than the fabric-ribbon inks.

Graphic images with full backgrounds race through ribbons as fast as paper. After two black-background IBM screen dumps and three colorful Plantronics screen dumps, I ran out of black mylar. According to Envision, you can expect ribbons to survive 12 to 16 average screen dumps.

Printing a color image also consumes a good deal of time. Not only is the printhead speed slowed to allow denser packing of dots, but the head needs to traipse past each individual line up to four times. Thankfully, the VectorPrinter has enough smarts to run through its ribbons as efficiently as possible, retracing lines and shifting only when necessary.

As I mentioned, the color printing process can be accelerated by changing printing mode so that the entire sheet is printed in one color, the paper returned to its starting position, and the next color printed. Although the paper shifting process may result in some loss of true resolution, it actually seems to help colors blend. You can specify the location of any dot with precision to 1/360 inch horizontally and 1/144 inch vertically, but actual dot size is much larger.

Plotter Performance

Perhaps the biggest difference between the VectorPrinter and a plain dot matrix printer is its ability to understand HP-GL (Hewlett-Packard Graphics Language), an instruction set for computer plotters. Many HP-GL commands are for drawing vectors—sweeps of line in various directions and lengths. (A vector is a quantity with both direction and magnitude.) One command can draw a diagonal line simply by specifying its endpoints, a much more efficient way of sending graphic information than raster graphics, which specifies the characteristics of each dot.

> The VectorPrinter probably has more abilities than you can figure out how to use.

The VectorPrinter does not, however, draw lines as vectors. Rather, it absorbs a full page of vector commands and uses its microprocessor to sort a picture from them. Then it prints out the image dot-by-dot just like any other color dot matrix printer.

The big benefit is time—a page of vectors can be sent much faster than a page of dots. But the VectorPrinter has another advantage. Its large memory can serve as a buffer capable of holding roughly 6,000 vectors. To your programs and computer, the VectorPrinter looks like one devilishly fast plotter (taking almost *no* time to draw lines). Once the VectorPrinter's buffer is filled, it can keep the picture in memory and you can print as many copies as you want without tying up your computer.

Using the VectorPrinter can be a bit unnerving at first. Your computer pauses an amazingly short time for printing as the VectorPrinter fills up. Suddenly, your program says printing is done and you can do what you want—but the VectorPrinter just sits there.

You've just learned the vital difference between a true plotter and the VectorPrinter: A plotter draws as it goes along and, you know it's done because you can see the image. It needs no special command to tell it everything is over, it just stops. But without some signal that the end has come and gone, the VectorPrinter doesn't know that it has received a complete image.

Envision gives you two ways around this, a special "plot" command (which can be sent by software or entered through front-panel controls), and an internal timer that starts the VectorPrinter plotting after a sufficient delay with no additional commands flowing in from the computer.

The VectorPrinter works well with Lotus' *1-2-3* if you tell the program you're using a Hewlett-Packard 7470A plotter. You'll have to be creative to get the most out of the VectorPrinter, though, because the H-P limits you to two pens and the VectorPrinter has a full rainbow of colors.

Versatility

The VectorPrinter does not print as sharply as a daisy wheel printer, nor is it the fastest dot matrix printer you can find. It's not the only four-color machine on the market and it won't plot circles around a real plotter. Rather than improving on any single-purpose machine, it closely approaches the abilities of many different devices. Its value lies in its versatility.

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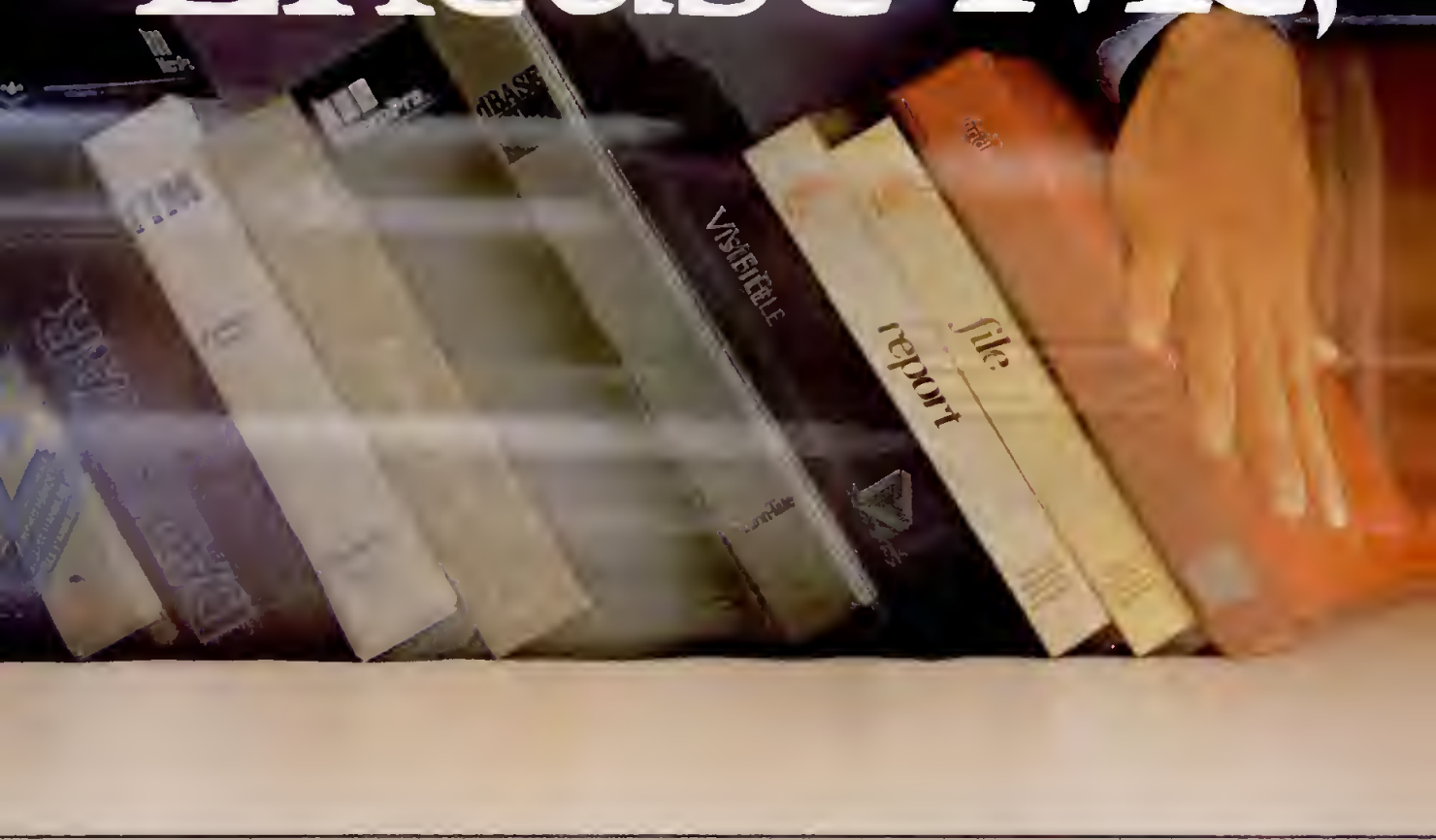
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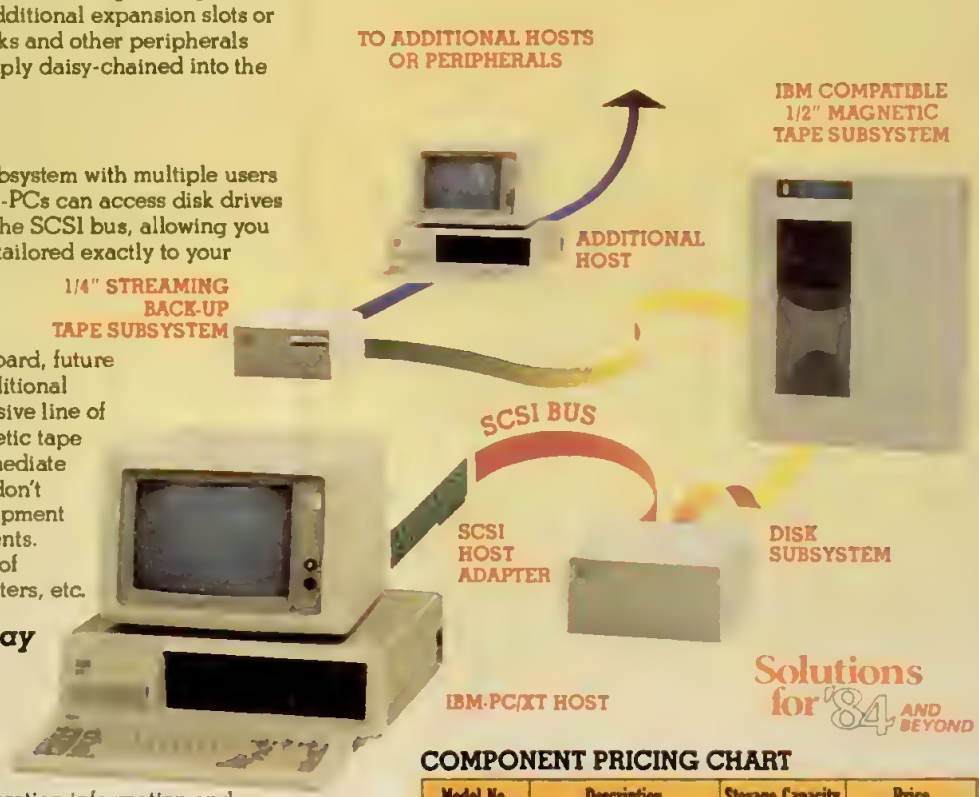
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Stitching Creative Designs By Pixel

Struck by the resemblance between a computer screen and a needlepoint canvas, two authors used a PC to design patterns that can be stitched pixel by pixel.

Computer graphics is a rapidly expanding field. Artists are using personal computers combined with both software and input devices to create drawings on screen. Now, these applications are spreading to other areas of creative design, including crafts such as needlepoint. We happened to notice the resemblance between a needlepoint canvas and a computer screen and set out to use an IBM PC and graphics software to design patterns that could be transferred onto a piece of canvas. We called our project computer-aided needlepoint (or CAN).



Figure 1: *The resemblance of the computer screen to a needlepoint canvas is apparent in this photograph of the computer screen, which shows a detail from a larger design in the* Kaleida *program.*

Needlepoint is a form of needlework in which you use a needle and thread to stitch designs in a coarse, open-weave canvas. Each stitch can be seen as the equivalent of

a single pixel on the screen. This is clearly illustrated by the design in Figure 1, which was generated using the graphics program *Kaleida* (which is available from Once Begun Computations, in Searsport, Maine). Our task was to see whether we translate one medium into the other—

As the brightly colored circles took shape on the canvas, the problem of aspect ratio became obvious.

stitch for pixel, and vice versa.

Problems became immediately apparent as we tried to count pixels. Counting vertically down the *y* axis was easy, but counting across the *x* axis was difficult because the pixels all run together. However, with the help of *Glyphix*, a drawing program with on-screen feedback of pixel location, we counted the horizontal pixels and translated this simple design to canvas. (*Glyphix* is available from Starside Engineering, in Rochester, New York.)

As the brightly colored circles took shape on the canvas, the problem of aspect ratio became obvious. Unfortunately the "canvas" of the computer screen does not have square holes. The computer "holes" are standing rectangles with a size ratio of approximately three on the horizontal axis to four on the vertical. The computer compensates for this to some extent when graphics shapes are put on screen. For example, if you ask for a circle with a radius of 20 pixels, the computer generates a (nearly) round circle on screen. But when you count the pixels displayed, you'll find that the horizontal diameter is 40, just as you ordered, but on the vertical *y* axis you'll count only 34. Translating screen circles to needlepoint canvas produces not circles, but short ellipses that are oriented horizontally. Despite this problem, we proceeded using a straight pixel-to-stitch translation of the on-screen pattern. The result was a bright, simple pattern that was slightly different than the on-screen original.

At the same time, we took a complicated needlepoint pattern, a drawing of a lion (see Figure 2 above), and attempted to translate it to the computer screen. We didn't attempt to draw the geometric border directly on the screen. Instead we programmed it in BASIC, which was ideal because of the repeating pattern. The central portion was far more difficult, however, and trying to use the DRAW command in BASIC didn't work, because the design was too complicated; 15,625 pixels (125 × 125) had to be drawn in.

Again *Glyphix* came to the rescue. Before the drawing program could be used, however, the design had to be plotted in such a way that translation would be possible. Special graph paper made for this purpose is sold in stores handling nee-

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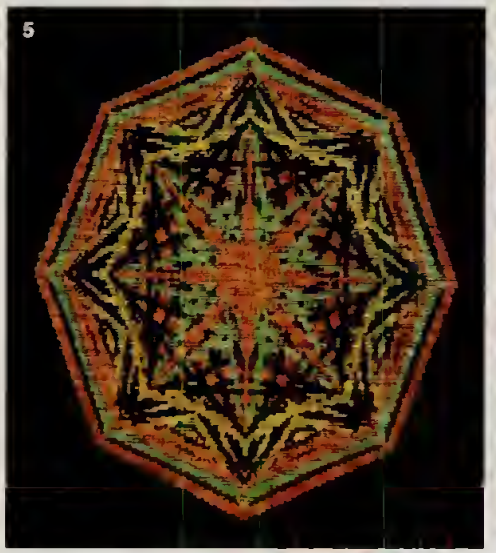


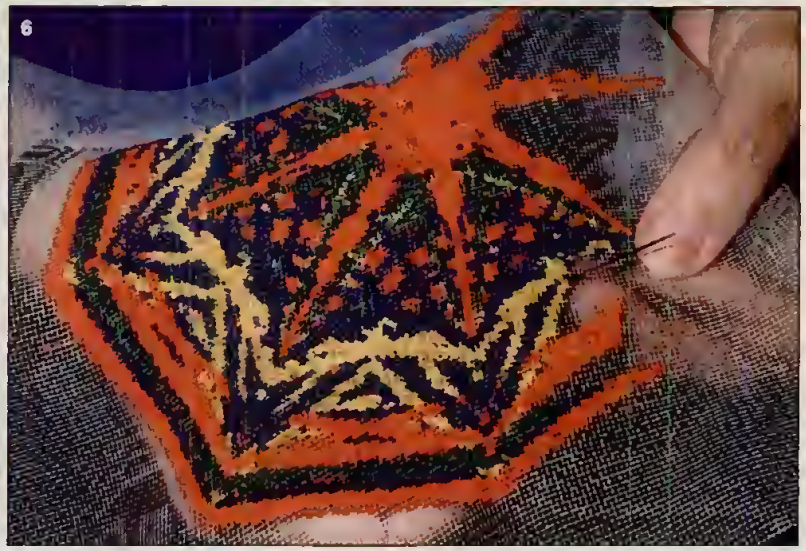
Transferring Designs from Screens to Canvas

Figure 2 is the needlepoint pattern of the fancy lion that caused us to begin thinking about the resemblance between pixels and stitches. Figure 3 depicts the simple plotting of a projected slide. This was the first method that we used to go from one medium to the other. Figure 4 shows the fancy lion on screen. Notice the difference in aspect ratios between screen and needlepoint. In Figure 5 *Kaleida Designs* shows the gentle elongation that will result in the correction of the aspect ratio when translated into needlepoint or any similar decorative art. *Kaleida Designs* comes to life in Figure 6 as the needlepoint takes form showing the same pattern shown in Figure 5.









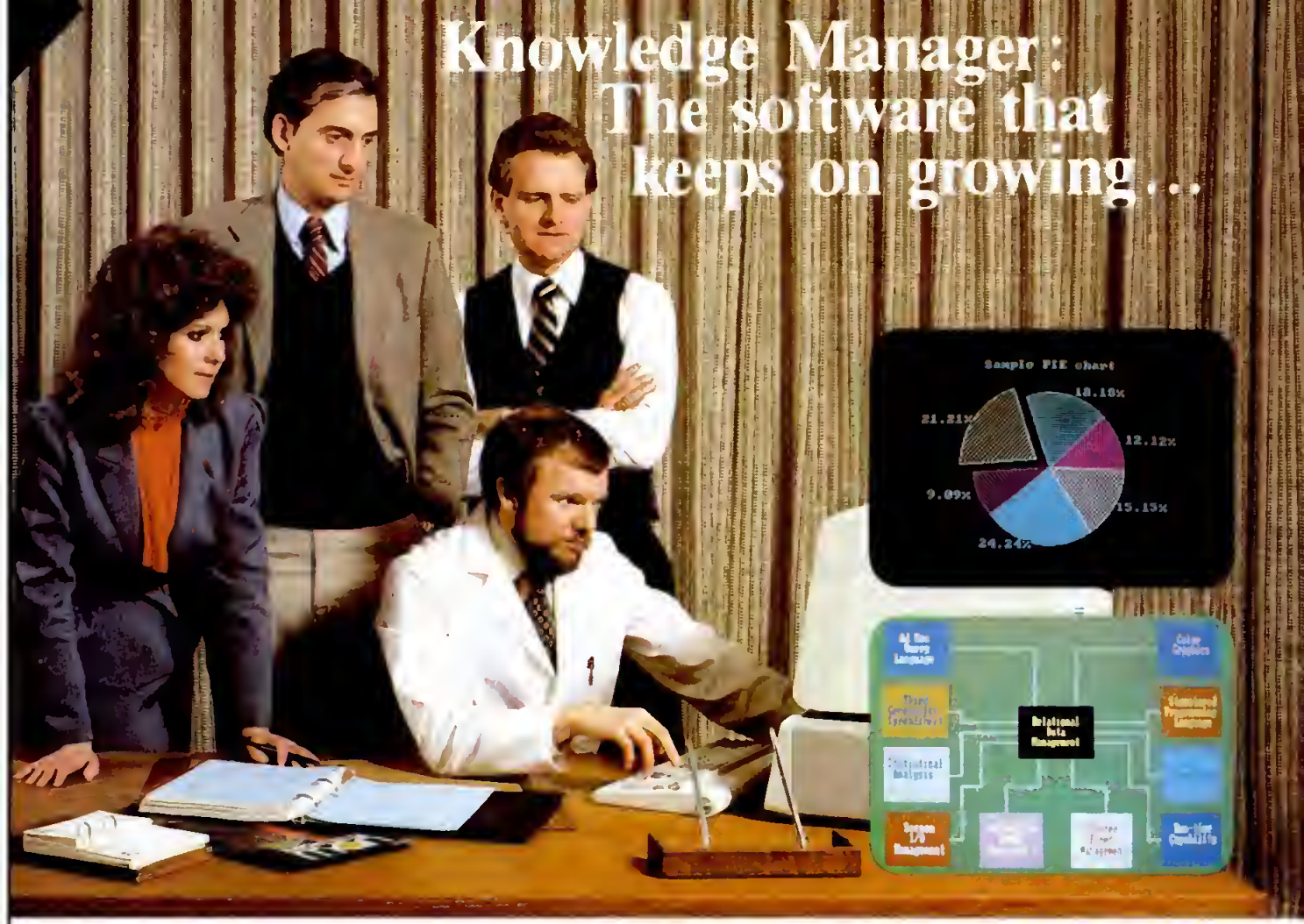
dlepoint supplies. We used a simple solution to get the design onto the graph paper. We projected a slide of the completed needlepoint onto the graph paper using a carousel projector (see Figure 3 above) and traced the outlines of the pattern. Then, using *Glyphix*, the line patterns were taken from graph paper coordinates and plotted on the computer screen (see Figure 4 above). As expected, the difference in the aspect ratios from screen to canvas is present but not obtrusive.

Thus, this translation of the fancy lion from needlepoint to computer used photographic-assisted transfer from one medium to the other via a graphed intermediate stage. But this method is time consuming, and the computer offers no assistance.

Several possible solutions to the problem of the aspect-ratio difference between the computer screen and the needlepoint canvas exist. You can accept the distortion, as we did with our circles (and with the lion on the computer screen) or ignore the actual numbers of horizontal pixels and use direct measurements of horizontal distances from a printout or photograph. This solution is circuitous; we intended to translate either medium to the other on a one-to-one, pixel-to-stitch basis. A final solution would be to correct for the aspect ratio discrepancy when screen graphics are created. This solution is the best one, because it allows the computer to provide the most assistance.

(continued)

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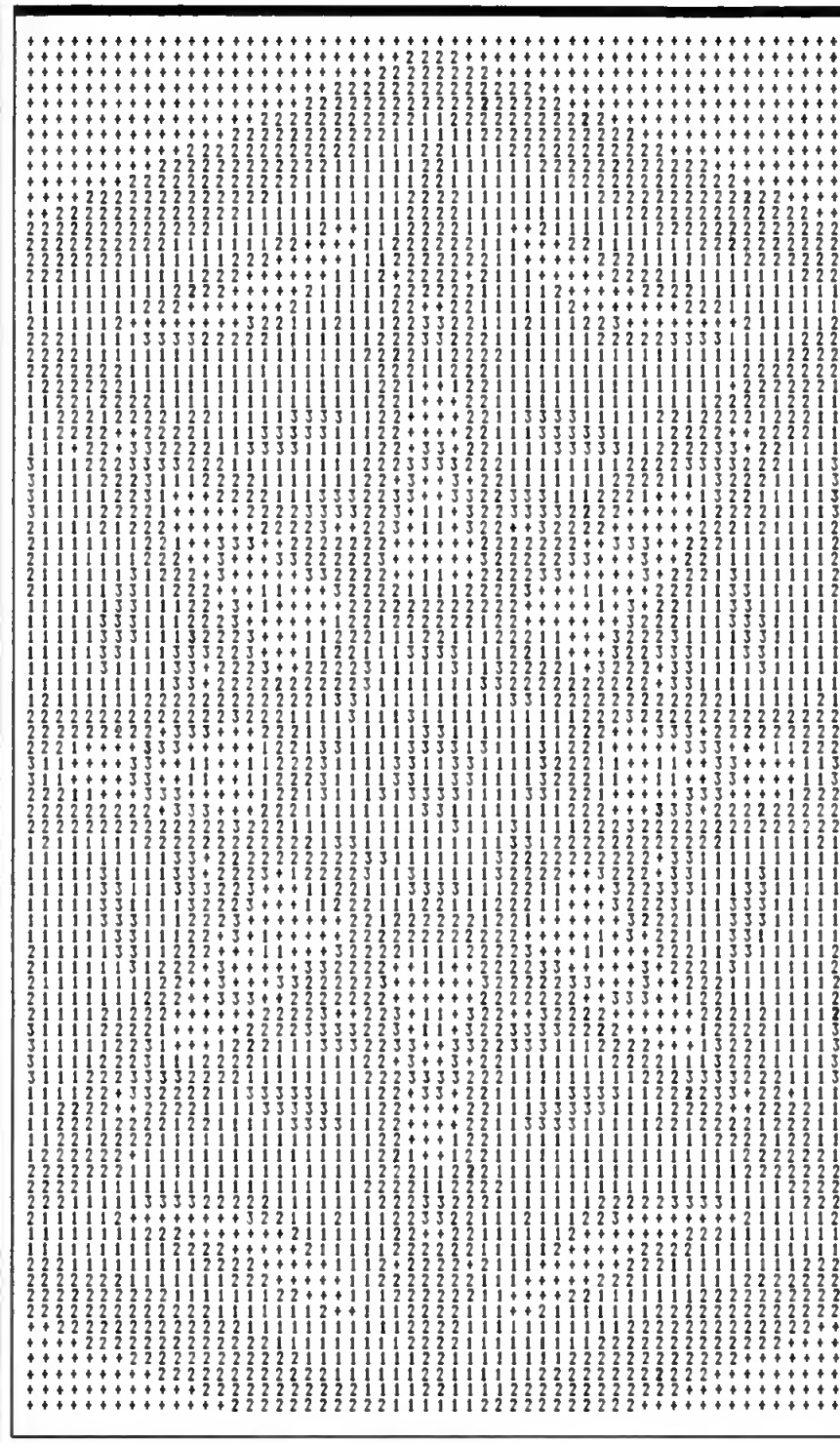
We still didn't have a solution, but help turned up in the form of M. Gary Cohen, *Kaleida*'s author and proprietor of the software firm Once Begun Computations.

We had written Cohen to tell him of our project to convert one of *Kaleida*'s designs to needlepoint and about our problems with aspect ratio and of plotting our designs onto graph paper.

Kaleida Designs' patterns can be manipulated and can be frozen at various degrees of complexity.

Cohen responded that he could correct *Kaleida*'s aspect by elongating it in the vertical dimension and then provide a program that would print out the design, pixel by pixel. Each pixel would be represented by a number, which corresponded to one in IBM's color graphics palette! His new version, which will be called *Kaleida Designs*, would produce correctly proportioned, printed patterns.

When the *Kaleida Designs* prototype program arrived, we booted it up, and there was our friend *Kaleida*, in a form that would correct the aspect ratio when its printout was used for a needlepoint pattern (see Figure 5). We let the program run and then hit the "freeze action" key when the right design flashed on screen. After turning on the Epson printer, we pushed D (for dump), and for the next 19 minutes the screen pattern printed out in three strips, which, when pieced together side by side, included every pixel. Each pixel was marked either with a + for background color, or a 1, 2, or 3 for the appropriate color in the IBM graphics palette. When taped together, the entire design was displayed in one large pattern (the central portion of a *Kaleida Designs* printout accompanying this article)—the ultimate



The central portion of a printout from the *Kaleida Designs* program. Each pixel is labeled according to its color in the IBM PC medium resolution graphics palette. Background pixels are indicated by a plus (+) sign.

"paint-by-numbers" design!

At this point we ran into the final but inevitable bottleneck: reproducing in stitches the extremely complex screen design, which, even when squared off to include only the *Kaleida Designs*' pattern and a surrounding border, contains approximately 40,000 discrete points. We were ready to give it a try and obtained the appropriate silk yarns, matching IBM's medium-resolution palette 0. We chose a blue background, and slowly the intricate pattern, which is shown in Figure 6, took form. (Bear in mind that *Kaleida Designs*' patterns can be manipulated to some extent and can be frozen at various degrees of complexity.)

By the time this article appears, the design should be complete. Sewn with silk thread on a fine canvas and of tapestry quality, it will measure 8×8 inches. Thanks to Gary Cohen, our canvas truly represents computer-assisted needlepoint.

We have now come full circle. With the soon-to-be-released *Kaleida Designs* the user will be able to specify the shape, size, proportions, and colors of the computer-generated design and thus produce a myriad of patterns suitable for decorative arts and crafts. In addition, patterns can be frozen on screen or saved on disk to be compared with other designs; designs can be formed and manipulated with keyboard commands. And, finally, shapes can be printed out either as finished graphics or as graphs with colors plotted by number (as described above for the prototype program we used for the needlepoint). These designs are applicable to almost any decorative medium—tilework, rugs, needlework, or whatever you can think up.

The future promises numeric screen dumps for design purposes. With these, any on-screen graphic pattern can be printed out "by numbers" for translation to needlepoint or any other medium. Is there such a program? Not yet, but Cohen's working on it, and the utility—tentatively named *Pixel-ID*—is on the way. Now, if we can only figure out some way to get the PC to do the stitching. ■

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Multi-Function Cards for IBM PC and XT

(Each card now comes w/ SuperDrive & SuperSpool)

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Memory installed on card — none 64K 128K 192K 256K 320K 384K
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above plus game port — $252 $302 $352 $402 $452 $502 $552

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w/both parallel & serial port No. 2 — $309 $345 $390 $449 $499
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Additional Parallel (P), Game (G), or Serial 2 (S2) port add $35 ea

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QUADMASTER II — 9-Function memory expansion card for IBM PC

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- Chronograph
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- Queues directly out but to LPT 1 & 2 or 3
- QuadRAM drive
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TASC MASTER software with AddRam Elite or AddRam Plus Ultimate Multi-Function Boards

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Control Data 9409, full ht, DSDD $225
Control Data 9428 half ht, DSDD $199
Teac 55B, half ht DSDD Sale! $169
National, half ht, DSDD Sale! $165
Qume 142, half ht, DSDD $236

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3550 — 33 CPS 203 col., proportional space bi-directional parallel $1,675
2050 — Similar to 3550 but 18 cps $839
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Above [illegible] ribbon

C. ITOH F-10

40 CPS [illegible] $895
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Tractor F-10 $225

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Optional Tractor $98

ROLAND DXY-800 Plotter

Now includes free software

Been intelligent X Y Plotter 11 speed 180mm/sec IBM-PC compatible 11" x 17" paper size Horizontal or vertical operation Dual speed switch Parallel [illegible] $895

The POWER DIRECTORS

P2 — A unique control center and surge protector w/8 lighted and a master rocker switches for your computer & accessories. It also filters out EMI & RFI interferences $126
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EPSON

FX-80, 160 CPS, 80 Col., friction & tractor feed, parallel . . . Call
FX-100, 160 CPS, 132 Col., friction & tractor feed, parallel . . . Call
MX-80F/T, 80 cps, 80 col., tractor and friction feed, parallel CALL
MX-100F/T, 100 cps, 136 col., tractor friction feed, parallel CALL
RX-80 120 cps 80 col tractor feed only parallel CALL
RX-80F/T, same as RX-80 but includes friction feed CALL

STAR GEMINI

Gemini-10X, 120 CPS, 80 Col., friction & tractor feed, (parallel) $Call
Gemini 15X, above w/15" platen Call
Delta 10, 160 cps 80 col., parallel Call
Delta-15, above but 15" carriage Call
PowerType, 15 cps daisywheel CALL
Radix 10, 200 cps 80 col parallel CALL
Radix 15, 200 cps 132 col parallel Call

C. ITOH

8510AP Prowriter, 120 cps, 80 col., graphics, parallel $335
8510-BP, above but 180 cps $CALL
8510-SCP, above but w/3 color ribbon (red, yellow, blue) also capable of doing orange, green, purple etc Call
1550 Prowriter II, 120 cps, 136 col 2K buffer graphics parallel $525
1550-SP, above but 180 cps $CALL
1550-SCP, similar to 8510-SCP but w/15" carriage $CALL

IDS PRISM

IDS Prism 80 [illegible] Printer, graphic tractor/friction feed parallel $1,199
IDS Prism 80C, above + 4 color $1,299
IDS Prism 132, similar to Prism 80 but 132 columns, parallel $1,395
IDS Prism 132C, above + 4 color $1,495

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Super dot-matrix printer w/24-pin hi-resolution head 192 CPS draft 100 CPS letter-quality
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ML-84S, above but serial $1,059
ML-92P, 160 CPS, 80 col., friction & tractor feed, (parallel) $CALL
ML-92S, above but serial $599
ML-93P, 160 CPS, 136 col., tractor & friction feed, (parallel) $739
ML-93S, above but serial . . $799
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New! 25 CPS daisywheel printer w/2 color printing, 3K buffer, proportional spacing, etc Parallel CALL
Tractor for HR-25 $119
Cut Sheet Feeder for HR-25 $199

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Tractor $119
Keyboard $173

JUKI 6100

18 CPS daisywheel, 13" platen, 2K buffer, 3-pitch, (parallel) $436
Tractor for 6100 $120

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- Two replacement PROMs adapt the ML 92 and 93 to all IBM commands.
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OKIDATA

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*12 cpi and downline loading character sets are not available with Plug 'n Play

OKIDATA μ92 microline



PROJECT: DATA BASE

Part 4

In this installment of PC's six-part series, we cover all of the Category 2 databases—those that can handle more than one file at a time.

In the last installment of Project: Database we wrapped up the Category 1 databases—those that can handle only one file at a time. In this issue we'll unwrap the Category 2 packages.

These databases must be able to work with at least two files in some of their functions—perhaps during data entry or for creating reports. All but one of the databases in this category are relational, and many of them also include a query language that lets the user get information from the database selectively

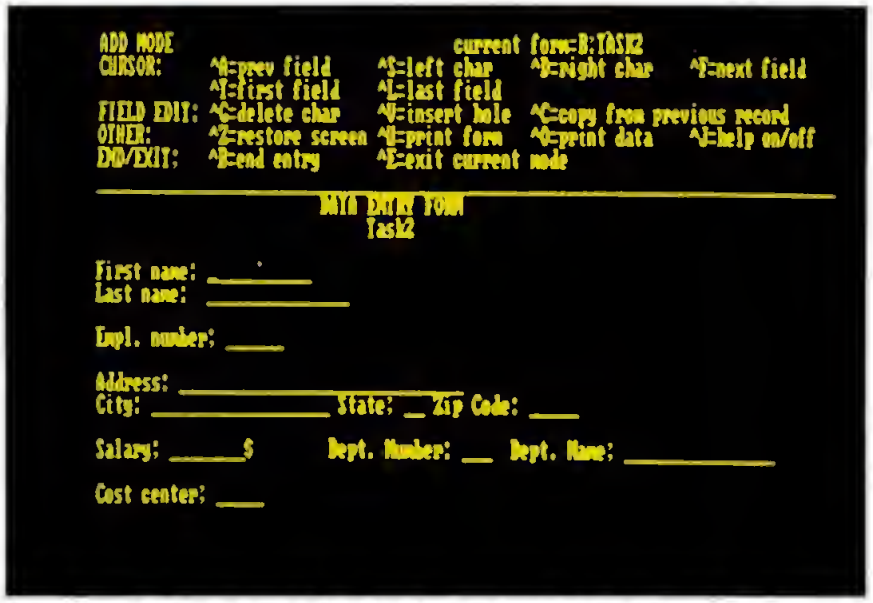
At the low end of systems that fall in this group, *TIM IV*, *KeyBase* and *FORESIGHT DATA MANAGER* offer simplicity rather than lots of power. *PC-FILE 'N REPORT* enhances its power with a table lookup feature, while *InfoStar* uses relational operations to combine data from as many as 16 files.

Three of the packages fall squarely in the middle of the second group. *ASAP FIVE* is truly relational. *KeepIT* can link several files and has a query language. *R:BASE SERIES 4000* includes a powerful English-like query facility.

At the high end of this category, *10 BASE* provides an easy-subset of SQL, and *ALADIN* offers its own fast query language. This medley of products makes for a Project: Database package worth unwrapping. —**Stephanie Stallings**

PROJECT: DATA BASE

InfoStar: Family Traits



The Add mode in *InfoStar*'s database module, *DataStar*. Note *WordStar* control characters on menu.

InfoStar is MicroPro's name for the combination of its database manager, *DataStar*, and report writer, *ReportStar*. *InfoStar* is a powerful and flexible tool, but it requires some study before you can properly take advantage of its many features. It allows both dynamic and physical joining in its relational operations, is miserly of disk space needed for data manipulation and storage, and produces highly complex reports with many *WordStar*-like enhancements.

The documentation comes in three IBM-style three-ring binders with a typeset, copiously illustrated text. *DataStar* is resident on a single disk, *ReportStar* on two. Two extra disks provide a tutorial for *ReportStar* and some practice data files. The tutorial is a superb introduction for the novice but slow going for the database-initiated. Unfortunately, there is no manual for the tutorial; you must leap in and boot it up. *DataStar* and *ReportStar* feature additional lengthy, step-by-step instructions that take you through some rather complex procedures with minimal confusion. The manuals' extensive reference sections contain detailed explanations for operations.

InfoStar is essentially menu-driven, with multiple help messages that list the *WordStar*-style Ctrl-key command combinations. Error messages consisting of short sentences appear either during data entry or after form generation. The messages usually refer you to further discussion in the reference sections, and uncorrected mistakes usually bounce you out to DOS. In fact, when learning the ins and outs of *InfoStar* you will find yourself spending a lot of time in DOS, pondering how to redo your last routine to take advantage of more of *InfoStar*'s many options.

Micro Pro
International Corp.
33 San Pablo Ave.
San Raphael, CA 94903
(415) 499-1200
List Price: $495
Description: Relational
Requires: 96K RAM, 1 disk drive.
Records per File: 65,535

CIRCLE 668 ON READER SERVICE CARD

Free-form Data

DataStar, the data manager portion of *InfoStar*, provides a screen for free-form generation of data entry forms. In addition to "painting" the entry form any way you want it on the screen, creation of the entry form involves specifying data types, calculated fields, automatic conversion to upper case, required fields, necessary verification, and data entry from other files. The same form is used to query the file, retrieving records one at a time by file order, index order, or as a match for specified conditions. Browsing of entire data files is not supported as such, but the disk files are pure ASCII and may be accessed through DOS or a word processor. Entry forms may be up to three pages wide and several pages long, so you can probably make exact copies of the paper forms you are using right now. *DataStar* uses files



with variable length fields, but updated entires are overwritten in the file, if possible, or written to the end of the file if necessary. An additional nicety associated

Illustrations: Phil Anderson

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feature does not print
negative numbers,
ou can develop much more flex-
ne customized reports that include fields from up to 16 separate files. The report format (up to 255 columns wide and 255 lines long) is developed on a screen to include headers and footers for both the entire report and its individual pages, embedded *WordStar* printing codes, and nonprinting fields. In the report definition module, many optional arithmetic and logical operators for specifying variables and calculated fields are available. Other field conditionals include LOAD WHEN, UNLESS-THEN, output of field to file, right justify, and pad and float character selection. You can have the report output to printer or file but not to the screen. You can examine the output on the monitor only by displaying the disk file through DOS (which is hard to read because of flickering during scrolling) or with a word processor. Output to disk of a report extracting fields from two or more files that have different field specifications, but that share one key field, effectively creates a new file with those fields (an intersection relational operation). When a file is output, a view of the record format is displayed on the monitor, but the records themselves do not scroll past.

A Special Sort

A special sort program will sort a file on up to 25 key fields, as specified in the file's associated data entry field definitions, by either overwriting the original file or creating a new file. This facility will also perform file maintenance and will merge from 2 to 24 files that have identical field structures.

InfoStar is undoubtedly well endowed and will appeal to those who need sophistication and flexibility in a relational database manager. *WordStar* users will feel especially comfortable with *InfoStar*, which was designed to interface with *WordStar*, *CalcStar*, and *PlanStar*. MicroPro has recently released another *Star* family member, *StarBurst*, a menu-building program that will also execute stored scripts with *InfoStar*.

In doing an ad hoc query of information from the two test data files, I created a report screen that listed the fields I wanted reported. One of the fields was required to be the key field shared by the two files, but I did not want this printed, so I placed it in a nonprinting line on the format screen (marked by a dot at the left). I then sent the report to a disk file to be read later. To do a second report that listed all the fields in both test data files and sorted them by salary within department, I created a new report screen with all files listed, output the report to file, and then sorted this new file by the two fields. I made several false starts in developing these reports, mostly because key fields and index fields must be designated very carefully and the operations are complex and tedious. The introductory section of the *InfoStar* manual devotes little attention to relational operations; however, these are fairly straightforward once you have read the right pages in the reference section.

There are a few rough edges in *InfoStar*. The cursor can outrun the program and just disappear for a while. When you create report screens, you can move the cursor to the right over characters a space at a time with Ctrl-key combinations, but you must move it over blank spaces with the space bar. Some refinements are missing in this otherwise-loaded-with-extras package: You will not find support for IMB graphics symbols; password or encryption; special date or time conversions; inverse video; or designation of integer, real, dollar or date fields with associated automatic floating characters, decimal points and space characters (you must designate parameters and calculations associated with these special fields yourself).

The give and take between flexibility and ease of use seems to be weighted towards the former, and *InfoStar* procedures are complex and sometimes tedious. *InfoStar* would be most agreeable to someone who likes its *WordStar* Ctrl-key commands and nonsimplified data definition methods.—**Richard Zander**

(Continued)

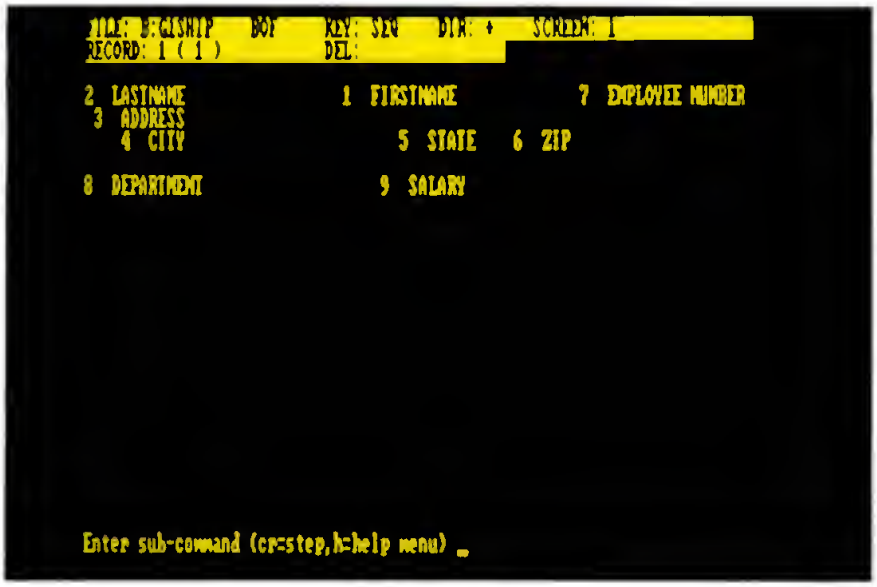
```
Name                Empl. Num.   Address
 Dept. Num.   Dept. Name      Salary

Doug Williams          120740        P.O. Box 57165
                                        Washington DC 20037
 100   Accounting              12000
Ted Wickland           150140        9734 Grant St.
                                        Omaha NE 68134
 100   Accounting              12000
Carl Swann             143840        PO Box 2141
                                        Chesapeake VA 23320
 100   Accounting              12000
Marshall Partridge         148040        2608 Eighth St.
                                        Berkeley CA 94710
 100   Accounting              12000
Ione Owens             125990        9083 Sunflower
                                        Alta Loma CA 91701
 100   Accounting              12000
Mark Milton Clarke     154340        51 Fremont St.
                                        Needham, MA 02194
 100   Accounting              12000
```

A custom report of the employee database in *InfoStar's* report module, *ReportStar*.

PROJECT DATA BASE

TIM IV: Mature Power



The employee record format as designed with *TIM IV*.

TIM IV *(Total Information Management)* is a mature, easy-to-use database program whose capabilities approach those of relational database packages.

It offers all the features standard to simple, single-file database programs in a tidy, easy-to-understand and well-documented package. In addition, it offers some less common, although limited, two-file capabilities.

TIM databases are simple to create. Field names, lengths, and types are specified on a layout sheet that lists most of the available options. Besides standard character and fixed-point numeric data types, *TIM* allows calculated fields (the total of sets of fields, or the simple arithmetic functions of another field) and what it calls "inverted fields."

Inverted fields are most commonly used with people's names. In this case, it is efficient to enter and store the name as "John Doe," but it would be nice to be able to sort and search it as if it had been entered as "Doe, John." *TIM*'s inverted fields do this automatically. The same principle also applies to fields defined as dates. Dates can be entered in either a month/day/year or a day/month/year format, but they are sorted in chronological order, as if they had been entered year/month/day.

TIM provides a default layout for input screens but allows you to specify your own screen for any file. Unfortunately, neither of these approaches is particularly successful. The default screen displays a blank immediately beside the field name for data, but the field names are lined up along the left-hand side of the screen. Consequently, the blanks for the data don't line up u. names is exactly t.

You can specify y layout, but only one screen must display the cannot display any othe instructions. It requests fiel order the fields are named in th instead of the order the fields appe screen. If you have designed a fil for example, names and addresses and telephone numbers last, but are co ing the information from a form where th telephone numbers appear beside the names, you are able to make the screen look more or less like the form. But you'll be asked for the telephone numbers at the end, and your eye will have to travel all over the input form—exactly what you were trying to avoid by specifying an input screen. Of course it's still better than not having a custom input screen at all.

TIM stores data in the order records are entered, in fixed-length fields. Any number of fields can be designated as index fields, and a separate index file is created for each of them. Indexes are compact—only 2 bytes in the index for each record in the database. New records are accumulated, and indexes are not updated until data entry is complete. Index updating can be postponed, although any search or report function that depends on the index will also have to be postponed. Indexes can be added or deleted at any time. Adding a new index to a 500-record test database took about 2 minutes, where the index was on two fields. This process is equivalent to sorting, and *TIM* does not have any other sorting processes.

Searching for records on screen can be done only according to a single field at a time. If the field is an index field, *TIM* knows to search according to the index and can find any record in 4 seconds or less. If the field is not an index field, a sequential search is done. Using a sequential search, *TIM* found a record in the middle of our 500-record test database in about 1 minute.

Extracting records is more sophisticat-

Innovative Software, Inc.
9300 W. 110 St. #380
Overland Pk., KS 66210
(913) 383-1089
List Price: $395
Description: Flat files, with some multifile capabilities.
Requires: 128K RAM, 2 disk drives, DOS 1.1.
Records per File: 32,767

CIRCLE 669 ON READER SERVICE CARD

ed process. Record selection criteria can be fairly complex, and extraction to a file produces a completely new database. Extraction specifications are saved for future use, and the specifications can include variable information for which you are prompted each time the extraction is run. If, for example, each month you wanted to extract all the records altered that month, and date of alteration was the fifth field in the file, your extraction specifications might read

```
FLD 5 GT **
```

The ** would cause *TIM* to request a value at each execution of the extraction.

Extracted records, or the entire database, can be reported on simple tables or in more complex formats. *TIM* offers a Quick Print option, which is a sequential dump of the file. If that is not sufficient, *TIM* can print a tabular report, typically one line per record. Tables can be printed according to the order of any index field. Totals and averages for any numeric field, as well as counts of the number of records, can be reported at any change in the index field or at the end of the report. A report can contain any of the fields in the file. Formatting is limited! Column headings must be the name of the field, and columns are separated by a single space.

TIM also allows a severely limited selection of fancy report formats. The specification of report formats is awkward and somewhat inflexible. Mathematics and summaries are not possible. Trailing blanks within a field cannot be deleted. Each record in the database is printed on a single page in the report. Formatting is one of *TIM*'s least impressive features.

In two situations, *TIM* can work with two databases at once. The two databases must contain a common "link" field, which must be an index field.

In a tabular report, *TIM* can extract and print from the secondary database, all records with the same value as the link field in the current primary database record. It can also total fields from the secondary database. Databases set up for testing included a small Departments database, which listed five department names and code numbers, and a People database containing 500 personnel records, each of which included a department code. *TIM* could be instructed to print the Departments database and, for each of its records, to find, print, and total the relevant personnel records.



TIM includes many features that are not essential, not very sexy as marketing tools, but that are nice to have.

TIM also allows two types of two-file transactions: posting and look-up. Posting means accumulating in a summary database (such as the Departments database) information from the records in a detail or transactions database. Look-up, naturally enough, means finding information to fill one field by looking up the value of another field in a second database. For example, you might fill in a "department name" field in the People database by looking up the department code from the people record in the departments database.

This is the limit of *TIM*'s two-file capability. It does not permit fancy-format printouts that use two databases, Look-up during data entry, or any other functions. It's a start, but not enough to classify *TIM* as a second-level product.

TIM has been on the market for 4 years, certainly time enough to collect feedback and make improvements. It consequently includes many features that are not essential, not very sexy as marketing tools, but that are nice to have. The Quick Print feature is one; others include listing and counting records by key; file password-protection; tools that make it easy to create a new database that is similar to an existing one; easy loading of standard ASCII files into a database; and generating files that can be used as input to *WordStar*, *VisiCalc*, *Magic Wand*, and a half dozen other programs. You are provided with a set of BASIC subroutines that make it easier to write programs that use your *TIM* files. There are utilities that allow you to reconstruct a damaged database file. Also included is a fine set of example applications, described in the manual and accompanied by appropriate files on a tutorial diskette. The manual includes a detailed description of the file structure and organization.

The *TIM* manual is clear, well organized, and arranged into chapters that exactly match the choices on the *TIM*'s main menu. Each chapter walks you through all the prompts and possibilities a particular menu choice can produce. The manual's index is weak, but the manual is otherwise excellent.

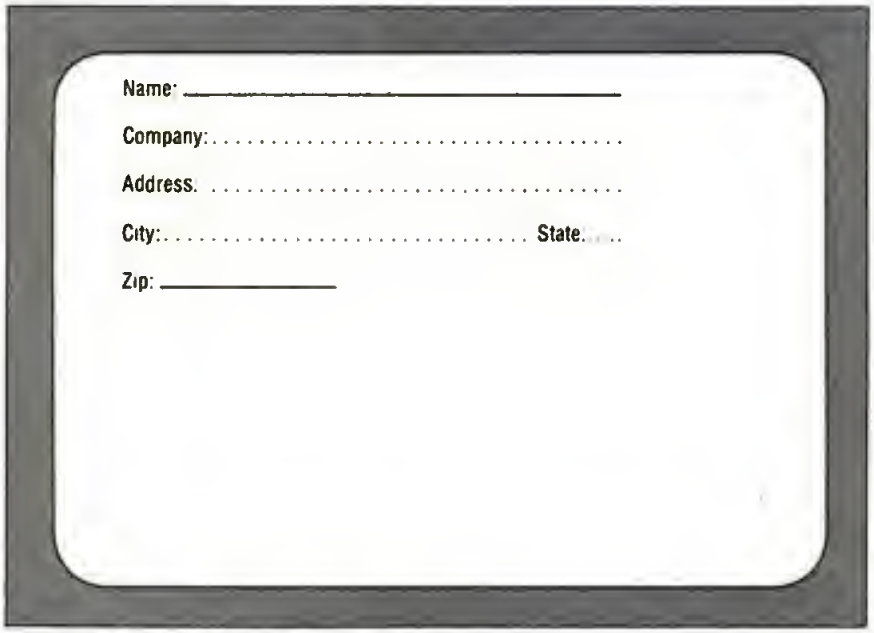
TIM remains a bit of a puzzle. The program is powerful and sophisticated—and evidence that a talented software designer was at its heart. But perhaps it's more of a programmer's program, rather than an amateur user's program. It works well, and its extra tools will delight those who want to know more about how it works, or who want to make other programs work with it. Yet its input and output have real weaknesses, which make the package more difficult to use than it should be. Could it be that its talented designer had trouble imagining how the real world of data-entry clerks, forms design, and statement and invoice printing works?

— **John Helliwell**

(Continued)

PROJECT DATA BASE

ALADIN: Practice Makes Perfect



Data are entered on an *ALADIN* screen form.

I admit to having a prejudice against Pascal software. In my experience, Pascal applications programs are over-large and slow. As soon as I saw *ALADIN* sign on with a UCSD p-System banner, I expected the worst—but, I confess, I was wrong. *ALADIN* is small, fast, and capable. The program makes few unique demands on the hardware and contains many features. *ALADIN* was developed in West Germany; perhaps German programmers understand a few practical things about using Pascal that North American programmers don't.

ALADIN is advertised as an interactive and menu-driven program. It is both of those things, but I am not convinced that either of those attributes makes it any easier to construct and use a database. The menu structure hides many of the programming tasks from you, as it is meant to do. But several important tasks are not included in the menu plan, and they must be performed through at least two diverse methods of entering commands.

For example, the interactive menu feature helps you create the fields and relationships in the database. You are given options and selections to choose from, and the program makes things easier by entering information for you in repeated fields and related files. But if you want to change or specify the designation of the disk drive holding your data files, you can search in vain for a menu choice to help you do it. This selection is one of several options (not prompted) that you can select when the program first signs on, but you can't get at it through the menu structure. Similarly, if you want to change the file you are specifying, there is no menu selection to help you do that either. (The JUMP command sometimes appears on the menu, but it doesn't always work.) This action is one of several options (not prompted) that involve the use of the Esc key and a numeric command. It takes a lot of digging through the manual to find the options you can choose at sign-on and those that require the use of the Esc key plus a number. A program should provide a consistent way of choosing options; these three paths are too confusing.

Advanced Data Institute
1215 Howe Ave.
Sacramento, CA 95825
(916) 925-2229
List Price: $795
Description: Relational
Requires: 128K RAM (DOS 1.1), 192K RAM (DOS 2.0), 2 disk drives.
Records per File: 65,535

CIRCLE 670 ON READER SERVICE CARD

Give up Your Lap

If you like to use the PC keyboard on your lap, forget it. The *ALADIN* manual will occupy your knees until you have had a great deal of experience with the program. Some information is contained in a descriptive section in the back, but other information (such as how to read in data from files converted into the *ALADIN* format) appears only in the tutorial. Numerous addendum sheets in the back of the manual have no reference in the front. The *ALADIN* manual does not contain a phone number for the company, although I did get the number from information.

These complaints aside, *ALADIN* is a very capable program. If you use it on a regular basis, you can do almost anything with it. It could become a favorite among capable programmers who enjoy using Pascal. The options for statistical analysis, in particular, are excellent. If your database reports contain many numbers that are derived from multiple files, *ALADIN* could serve you well.

ALADIN'S Magic Module

If you want to create a new database with *ALADIN*, you have to ask for the installation module when you type in the name of the program. That is the only time you can get to it. This module operates with many of the same prompts and keystrokes as the data processing section, but it has different capabilities. *ALADIN* asks you for the name of the database structure you want to create and allows you to identify the major files in that database. The

program then takes you through each field and helps you select the type of data going into the field, the field length, and attributes such as field protection and linking to other files. This specified field linking is an important feature. Linking puts identical fields in more than one file and allows them to be changed simultaneously. You must also specify the key fields at this time. These are the fields that will be used to look up records.

While you are in this database design session, you can back up and make changes to fields or files you previously defined. In my experience, however, some of these changes did not seem to "take" after the first time through. Once you close the session and save the descriptions, the modifications you are allowed to make are very minor; you can't even extend the length of a field. If you try to make more than superficial changes to the database structure after you have entered data, you will lose your data files. You can save your files under another name and then "import" them back into *ALADIN*, but you should give very careful consideration to the structure before you enter a large amount of data.

An important limitation of *ALADIN* is its inability to use fields designated as integers or money in a multilevel sort. When I ran the *PC Magazine* tests, I tried to sort on salary and nearly lost all the hair on the top of my head in frustration. The specialists at ADI America finally wrote step-by-step instructions for me: Their solution was to create a separate character field that contained the same numbers as the numeric field I wanted to sort on. I could use the character field for sorting and the numeric field for mathmatical and statistical functions. Of course, this kind of construction eats up disk space and really complicates the problem of importing data. This trick is only valid if you change the numbers in the character field every time the numeric field changes.

ALADIN draws a data entry form on the screen after you describe the fields you intend to use. You can move the blanks in the form around the screen, but you can't change them in any other way. This automatic form generation is a nice feature, and the editor you use to modify the form works well.

You can enter data into the database system from the keyboard or from files that exactly meet the specifications of an *ALADIN* file. The *ALADIN* manual claims that the program can convert a wide variety of data files into the *ALADIN* format. The program allows you to specify the characters used to set off the fields and character strings used in the "foreign" program. In practice, I found that it took a lot of juggling between the input file, the conversion utility, and the input utility to create a file that *ALADIN* really liked.



Another interesting ALADIN function is its ability to merge certain fields from selected records in its database with a text file prepared on a word processor.

The entry of information from an existing *ALADIN* file is another department in which the menu structure only takes you so far and then drops you off. A menu option selects input from a file, but you are expected to either know or search the manual to find out that you have to enter a carat (^) into each field you want to read from imported file.

The keyboard entry works as expected. You move to the next field automatically when a field is filled or the Return key is pressed. If an entry does not match the form you specified, the program sounds a beep and displays an error message. You have to acknowledge the error message with the F1 key before you can go on.

Informal data retrieval with *ALADIN* is easy. The program gives you the ability to browse through the records, make changes to data within fields, and make fast ad hoc queries. You can call broad categories of records simply by putting the cursor on a field *ALADIN* draws on the screen and entering the information you want to match. You can make these entries with wild-card specifications that tell the program to search for the closest match.

ALADIN has a query module that functions differently from the query languages often associated with database management systems. The *ALADIN* query module is an on-line editor that is always present, but its function is optional. You can use the menu-driven query commands to describe conditions on which you want to select information for output and to filter entered data. You can use all of the common logical arguments and conditions such as *and*, *or*, *greater than*, *smaller than*, *equal*, and *not equal* to consider any or all of the fields in every record. But describing conditions in a query such as "The color is blue and the price is over $1,000" does not immediately result in any output. The *ALADIN* query module simply allows you to create a written

description that you can call later to filter data entry, generate reports, or make data inquiries. This interesting concept extends the idea of a data editor and makes it more flexible, but the possible confusion with more traditional types of query languages is unfortunate.

Merging Traffic

Another interesting *ALADIN* function is its ability to merge certain fields from selected records in its database with a text file prepared on a word processor. You can use the output files from many different word processors, including *WordStar*, *Volkswriter*, *MultiMate*, and the USCD Pascal editor. A typical application would be the merging of selected addresses from the database with a standard text file for a mass mailing.

The *ALADIN* report module has excellent abilities to retrieve and compile information from multiple files and to format a good-looking printed report. You can perform calculations as a part of the report generation process. The *ALADIN* calculator program can create simple bar graphs and scatter diagrams that you can incorporate into reports.

ALADIN includes a script language that lets you write a script of tasks for the program to execute. A script file would typically be used to move the program to the report generation module, call a report format, and run the report. In this way a single command can result in a finished and standardized report.

ALADIN operates well in systems that have a minimum amount of memory and only floppy disk drives. It has strong capabilities for generating statistics and printed reports and does an excellent job of providing referenced access to character information in multiple files. It is not, however, a program you can just pick up and use. *ALADIN* takes time and practice to learn and use effectively. It is not inexpensive, and you should be sure you need all of its capabilities, particularly statistical, before you pay the price.

—Frank J. Derfler, Jr.

R: BASE SERIES 4000: Make Room for Data



An example of an *R:BASE SERIES 4000* data entry form for an employee record generated for Project: Database.

Microrim has gone to great lengths to make *R:BASE SERIES 4000* easy to use. First of all, because *R:BASE* makes use of 256K of RAM, the first of the two system disks is retained entirely in memory, and the second is kept in drive A: to provide an overlay. Thus, you do not have to change system disks to bring up program modules necessary for some database manipulations as is the case with most full-featured data managers.

Microrim, Inc.
3380 146th Place SE
Bellevue, WA 98007
(206) 641-6619
List Price: $495
Description: Relational
Requires: 256K RAM, 2 disk drives, DOS 1.1.
Records per File: 2.5 billion or limited by disk space.

CIRCLE 671 ON READER SERVICE CARD

The well-written tutorial booklet and the demo disk take you painlessly through two good, true-to-life workplace examples requiring various database exercises. You actually feel you understand what is happening, which is impressive in a command-driven database manager. The documentation (an IBM-style three-ring binder of a little less than 300 pages, nicely printed on glossy stock) is directed to the needs of the novice and is well organized. Looking up information is easy with its good index, various type fonts that accentuate key words, and a separate booklet listing the various commands with their associated parameters and special syntax. Large card tabs separating the different parts of the manual are an immense help and make the manual a great deal more accessible.

R:BASE operations are controlled by command lines that state, essentially: "Do this to that under these conditions." A Help mode lets you read extensive expla-

nations of the various commands and their functions from the screen at any time. A second line of support for the beginner is a Prompt mode that provides a short synopsis of a specified command at the top of the screen, and a prompted "fill in the blanks" section below that guides you through the correct syntax of the command line. The Help and Prompt modes are optional and need not be used if you think you have mastered some or all of the commands, but these modes can be entered at any time. In fact, you can rewrite the prompts to provide yourself with whatever information you think you will need. This is a more efficient system than nested menus that all users, novice and adept alike, must step through. It's a good thing, however, that help is as close as your screen, because new owners get free help from Microrim only for the first 30 days. "Extended Support Services" cost an additional $150 per year, and the information hotline is not a toll-free phone number.

Chapter One

The first chapter of the manual is a good introduction to *R:BASE*, discussing the Help and Prompt features and describing how to open a database, exit, and set defaults for certain functions (expression of dates, bell on, error off or on, lines per page). It does not, however, tell you how to work with relational databases in general. To learn how to set up your data files if you're a novice, ask a data processing expert to recommend a good introductory text.

Entering data in *R:BASE* is quite efficient. Its custom screen forms are good-looking and easy to create. You can place any text (including fully spelled-out field names) anywhere on the screen and then position the data entry fields relative to the text prompts. You can easily add prompt lines, notes, lists of abbreviations, and even IBM ASCII graphics to the form. After you finish entering data on a form, you can go back and modify any field you have previously entered, if necessary. It



The well-written tutorial booklet and the demo disk take you painlessly through two good, true-to-life examples requiring various database exercises.

then takes just two keystrokes to add the data to the file. (It would have been helpful if *R:BASE* made better use of the function keys.) Files from *dBASE II*, *Multiplan*, *VisiCalc* and *1-2-3* are easily transported into *R:BASE*.

You can have the program check the data you enter to make sure that the spelling is accurate and that the data is within a specified range of values by creating a Rules file for a particular data file. The Rules file provides for simple comparisons of up to ten values or for "table look-up" of complicated data entries, such as checking to see that postal abbreviations for states are correct. Rules checking also allows you to use arithmetic operators and requirements to include certain text values in the entered data. If desired, you can require that a particular data field be filled, and you may devise your own error messages for nonfulfillment of a data entry criterion.

Unfortunately, *R:BASE* contains no browse function as such. Horizontal scrolling, present only in the report creation facility (to allow formatting of up to 132 columns) would have helped display all fields when you are querying files with many fields. You can, however, get around this problem by either querying the database about just those fields that will fit on your screen (at one record per line) or by defining a report format that produces a multiple-line record retrieval. A third possible option is to use the Edit feature that calls up individual records using a data entry form.

Believe It or Not

The English-like query language is simple, but it includes some powerful options. Believe it or not, the typical *R:BASE* command line query, SELECT fieldname1 fieldname2 fieldname3 FROM filename WHERE condition1 and condition2 SORTED BY fieldname1, is, after a few run-throughs, fairly obvious and easy to remember, especially when you are rewarded with data obtained under *R:BASE*'s touted fast retrieval time (1,000 records sorted on one key in 59 seconds). Basically, you are limited to querying one data file at a time and can do relational algebra on only two files at a time, although you can update and modify fields on all files in the database with a global function. Getting answers that depend on information in more than one file requires two or more relational operations followed by a query. However, *R:BASE* excutes commands for these functions quickly. Its relational functions are extensive and can be set up quickly as well. You can easily combine two files into one large file, or you can form a third file with various selected combinations of fields merely by specifying conditions for inclusion or exclusion of records.

The report writer is plain vanilla. You

Input Screen Specification

Method	Capabilities				
	No. screens per file	No. files per screen	Simulate paper forms?	Link help messages/ prompts to a field	Master/detail relationships
"Painted"	1	1, though some merging possible	Yes	No	Yes
Automatic, with limited "painted" screen capabilities	1	1	To a limited degree	No	No
Programmed	64	1	Yes	No	Yes, excellent with linking between files prompted on screen.
Automatic/ "Painted"	Unlimited	1	Yes, 23 rows by 80 characters.	Extensive prompts or help messages can be added to the form.	No
"Painted"	1	1	Yes	No	No
Automatic	Unlimited	Unlimited except by number of fields on screen.	No	No	Yes, up to 3 indexed fields per screen, with each index a detail
"Painted"/ programmed	Unlimited	16	Yes	Yes, both root and branching help files.	Only as index keys
Automatic/ "painted"	9, but all 9 must be part of same form.	1	No	No	Yes
Automatic	100	1	No	Yes	Yes

1. Follow instructions on the other side

Inverted Back

Back

1. Follow instructions on the other side

Foldout slip-sheet

1. Open the foldout page
2. Insert this sheet with
    1. Front side touching the free page
    2. Arrow pointing to the fold
3. Slice the folded edge
4. Close the page and slip-sheet

Folded edge of the page

Inverted Foldout slip-sheet

PROJECT DATA BASE

Name	Data Model	Marketing Features		
		Length of Time on Market	Number of Sales	Price
InfoStar MicroPro International Corp. 33 San Pablo Ave. San Raphael, CA 94903 (415) 499-1200	Relational	*DataStar* since May 1980, *ReportStar* since November 1982.	Confidential	$495, *DataStar* alone is $295, *ReportStar* alone is $250.
TIM IV, Total Information Management Innovative Software, Inc. 9300 W. 110 St. #380 Overland Pk., KS 66210 (913) 383-1089	Flat file, with some 2-file capabilities.	Since 1982	40,000	$395
ALADIN Advanced Data Institute 1215 Howe Ave. Sacramento, CA 95825 (916) 925-2229	Relational	Since December 1983	24,800	$795
R:BASE SERIES 4000 (Version 1.1) Microrim, Inc. 3380 146th Place S.E. Bellevue, WA 98007 (206) 641-6619	Relational	Since September 1983	Confidential	$495
PC-FILE 'N REPORT (Version 2.0) JASPIR International, Inc. 24 Salrit Ave. Waldwick, NJ 07463 (201) 445-8535	Relational	Since December 1983	1,000	$195
ASAP FIVE ASAP Systems, Inc. 2425 Porter St. #14 Soquel, CA 95073 (800) 345-2727	Relational	Since November 1983	1,000	$395
10 BASE Fox Research, Inc. 7005 Corporate Way Dayton, OH 45459 (513) 433-2238	Relational	Since December 1983	1,000	$495
KEEP IT (Version 2.1) ITSoftware P.O. Box 2392 Princeton, NJ 08540 (800) 222-0592	Relational	Since September 1983	4,000	$450
KeyBase SoftKey Software Products, Inc. 2727 Walsh Ave. Santa Clara, CA 95051 (408) 986-8148	Relational	Release date is July 15, 1984	—	$375

cannot number the pages or ask for special fonts, although you can specify any number of footer and header lines. When printing, *R:BASE* remembers how many lines have gone to the printer and will find the top of the page for the next requested report output based on that number. Turning the platen to reposition the print head at the top of a page just confuses the program; it is sometimes best to exit and begin again. An Extended Report Writer that should become available from Microrim soon will provide a considerable amount of flexibility.

I had no insolvable problems when working with *R:BASE*, though it has a few odd quirks. For instance, the END command is listed in the Help menu. I was curious to find out how much help the program could provide about this kind of instruction, so I typed END at the prompt, which immediately ended the help session.

A more serious problem is the large storage space requirement for *R:BASE* data files. *R:BASE* keeps all its related data files in one large file called the database. You delete records and files previously marked for removal by rewriting the whole database to a new file; you cannot delete or perform file maintenance on just one data file at a time. If you are using floppies and do not have room for the new database in addition to the old one on either your system disk or your data disk, Microrim advises you to make preliminary computations of the space needed. If you find yourself out of space, you can type the word Reload, press the Enter key, substitute a blank disk for the system disk, and write the new, smaller file to the blank disk. The new version, 1.1, includes a fix for a previous bug that destroyed data if the file was rewritten into a space too small for it—you now get an error message and can start over. Potential buyers should estimate their disk storage needs as twice the largest size of their data files will ever become, plus space for the usual burden of records that will be deleted and for any new files created during relational operations. This is true for both floppy and hard disks. The new CLOUT Natural Language Interface for *R:BASE* will reduce these demands for space by producing relational reports from five files at once with dynamic joins, which do not require disk storage space.

I would recommend *R:BASE* for both novice and the seasoned database manager user who have abundant RAM and disk memory storage. Its well-written manual and Help and Prompt modes make *R:BASE* easy to learn. The data entry forms and reports can be highly customized and the query, report, and relational options are simple to use and powerful.

I would recomend R:BASE for both the novice and the seasoned database manager user. Its manual and Help and Prompt modes make it easy to use.

Command lines may be saved in a special file so that *R:BASE* can execute sequential instructions for standard queries and reports or other database manipulations. A simple word processor, RBEDIT, is included in case you do not have a word processor of your own and want to avoid working with DOS' EDLIN. The command file allows a degree of programming for data management operations, including definition and storage of local variables, creation of separate menus for special routines, and implementation of nested IF-THEN-OR and WHILE-THEN-OR commands. A forthcoming Program Interface package will allow Pascal and FORTRAN programs to have direct access to *R:BASE* databases.

An Ad Hoc Relationship

To do an ad hoc query of information extracted from the two files provided by *PC Magazine*, I simply performed a relational operation to create a new file that included the three fields I needed and a fourth field that was possessed jointly by the two original files. The three fields could then be listed on the screen with a query command that looked like this:

```
SELECT lastname empl:num
Deptname FROM file3
```

To create a report that listed all fields in both original files, sorted by salary within department, I combined the two original files into one with the command line:

```
UNION file1 file2 FORMING file4
```

I next formatted a report screen. I typed the word *Report*, entered a name for the particular report format I would create, then gave the name of the file that the report would work with. Using a menu of report-formating options, I then "painted" the report on the screen, placing headers and footers in the positions I wanted them; defined a variable, Count; located on the report, with the cursor, the positions the reported field values would occupy; marked header, detail and footer sections on the screen; and set the number of lines per page. With practice, you can probably accomplish this process far more quickly than I can describe it. The report format was automatically placed in a special report file database when I finished. To produce the report, I gave the command line:

```
PRINT reportname SORTED BY
salary deptname.
```

The report was then scrolled to the screen.

Though *R:BASE* performs many functions well, I would not choose it because of its immense disk storage requirements.—**Richard Zander**

(Text continues following the Database Chart.)

Entry Editing Capabilities

None	Range Tests	Specific Values	Default Values	Table Lookup (to an Outside File)	Verify (Requires Data to Be Input Twice)
—	Minimum and maximum, specific values.	Yes	Yes	Yes	Yes
—	No	Forces numbers in numeric fields.	No	No	No
—	No	No	No	Yes, but limited.	No
—	Yes	Yes	Yes	Yes, but cannot fill data-entry field from table.	No
—	No	No	No	Yes, multiple table files may be used.	No
—	No	No	No	No	No
None	—	—	—	—	—
—	Yes	Via table lookup	1 to 40 characters allowed, and value may be computed.	Yes, limit of 200 items for table lookup.	No
—	Yes	Yes, via table lookup.	Yes	Yes	No

Entry Editing Capabilities (cont'd)			Adaptation to PC		
Required Field	Date Tests/Date Conversion	Other	ASCII Characters Only	Graphics Symbols	Color
Yes	Must provide formula.	Batch processing supported for large data entry jobs.	Yes	No	No
No	Yes, limited.	Read-only protection for designated fields. Fields can be designated for linking to other tables upon entry.	Yes	No	Yes
No	Accepts dates such as Dec 23, 83.	No	No	Yes, can do charting.	Yes; foreground, background, field, title.
Yes	No	Fields may be automatically skipped.	Special IBM graphics characters in upper ASCII set supported.	Yes	No
No	No	No	Yes	No	No
No	Yes	No	No	Outlines areas of screen.	No
—	—	—	Yes	No	No
Yes	Accepts date in format (MM/DD/YY) or (DD/MM/YY).	Read-only protection for designated fields.	Yes, for data files; some binary information in the screen files.	No	Border is blue, text area has white foreground and black background.
Yes	No	No	Yes	No	White letters on blue background.

DOS 2.x Subdirectories	Alternate input Methods (mouse, etc.)	Files Across Multiple Drives	Function Keys	User Interface	Files Methods of Data dictionary or other means
No	No	No, but *InfoStar* will pause so you can change disks	Yes	Menus	The entry form has a file definition sequance associated with it
No	No	No	Used effectively and consistantly for commends and screen prompts.	Menus/prompting	Data dictionary stored independently of date file
Yes, but not well documented.	No	No	Yes	Good menus and interactive prompting	Data dictionary built through prompted session
Yes, but only one subdirectory at a time.	No, but can program keys with *ProKey*.	No	Yes	Prompting	Data dictionary
No	No	No	Yes	Prompting, but prompts often too short	Created when entry screen is designed
Yes, automatically creates ASAP subdirectory, but cannot access other subdirectories.	No	No, but has multiple disk backup restore capability	Yes	Visual, with good use of reverse video, boxes, etc.; useful prompts.	Data dictionary
Yes	No	No	Yes	Visual/verbal; IBM SQL.	Data dictionary
No	No	No, but you can easily split files.	Yes	Menus	Creates a file definition file when creating data entry forms
No	No	No	No	Menu and user-provided prompting	Dictionary is embedded in program table

Files (cont'd)

Specification	Things You Can Specify				
Must files be built/modified only from data dictionary?	None	Field data	Tokens, aliases, or synonyms	Index data	Permissions/security
No, you can change the file definition at will, then enter any data to fit it.	—	Calculated field, constant, justification, pad field, must enter, auto copy, range checks.	No	Up to 25 fields to a key. Only 1 index allowed per file.	No
Yes, but utilities provided for reconstructing damaged files.	—	Length, name, type of field, whether it is a total or calculated field.	No	Any number of indexes per file.	No
Yes	—	Numeric, character, data, money, decimal.	No	Only as key fields	Read-only protection for designated fields.
No	—	Number of text characters, if key field.	A RULES command allows one of several possible values to be entered.	Any number of fields can be key fields, and any data type can be indexed.	Passwords may be specified at file level or for the whole database.
Yes	—	Alphabetic, alphanumeric, numeric, or dollar amounts.	No	No	No
Yes	—	Length, name and type.	No	May specify up to 3 fields as keys.	Read-only protection for designated fields.
Files are built with Define utility; data dictionary automatically updated.	—	Character, integer, decimal.	No	Yes, even after construction of the file.	No
Yes, but can override in specified situations.	—	Alphanumeric, integer, decimal, date.	Yes	Up to 3 independent indexes per file.	Passwords supported at data entry level.
No, can modify using an editor.	—	Length, type, picture.	No	May have a separate index for each field.	Password protection by application

					System
Encryption	Relations	Validity tests	Error or prompting messages	Multiple views of database	Maximum No. Record Types per Database
No	Yes	Checks length of entry, character type; refuses duplicate keys.	No	No, though effect achieved with merging technique.	Not limited by program
No	No	No	No	No	1
No	Yes, prompted and automatically inserted	Checks data types	No	Yes, from different portions of the program.	32
No	Yes	Entry-editing rules define data validity.	Yes	Yes, using union, project, and intersect commands.	40
No	No	Through table lookup.	No	No	Unlimited. You can design any type of file you want.
No	Automatic relations set up while database is in use.	Checks field type, legality of dates.	No	Yes, through definition of multiple screens.	Not limited by program.
No	Described by the SQL language.	Yes, program controlled comparisons.	Yes	Yes	Not limited by program.
No	No	Checks date format.	No	No	Not limited by program.
No	File relationships are specified in the on-line dictionary.	Can do range tests.	Yes limited.	No	1

Specifications					Error Handling
Maximum No. Fields per Record	Maximum Record Size	Maximum No. Records per File	Maximum No. Records per Database	Maximum Field Size	
255	4,096 bytes	65,535	Can have up to 16 files open; hence have access to 1,048,560 records.	120 bytes	Field-by-field and total reprompting
40	2,400 bytes	32,767	32,767	60 bytes	Field-by-field
512	4,096 bytes	65,535	Can have up to 32 files open, so has access to 2,097,120 records.	1,384 bytes	Field-by-field, total and selective reprompting
400 fields per database. Fields are distributed among the files.	1,530 bytes	2.5 billion, or limited by disk space.	100 billion, or limited by disk space.	1,500 bytes	Field-by-field and total reprompting
99	2,000 bytes	Limited by disk space.	Limited by disk space.	78 bytes	Total reprompting
Not limited by program.	Limited by disk space.	Limited by disk space.	Limited by disk space.	40 bytes	Does character-by-character appropriateness checking.
Not limited by program.	32,000 bytes	Limited by disk space.	Limited by disk space.	9,999 bytes	Field-by-field
99	2,400 bytes	32,767	Limited by disk space.	70 bytes	Field-by-field and total reprompting
2,048	32,000 bytes	32,000	Only files exist, no encompassing database.	2,000 bytes	Field-by-field is automatic; total and selective reprompting require programming

Data Types and Maximum Sizes

Character	Numeric				Date
	Integer	Floating point	Money or dollars	Other numeric	
120	Numeric is distinguished from alphanumeric only on calculated fields.	Yes, but not a default. Must be specified.	Not automatic	Aligns decimal point when defining field.	Not automatic
60	60 digits, including minus sign and decimal point; 4 decimal places.	No	60 characters, including dollar sign, decimal point and commas; 2 decimal places.	Up to 4 decimal places in fixed point.	Can be specified system wide as DD/MM/YY or MM/YY/DD format, and will be correctly sorted and ranged as YY/MM/DD.
78	12 digits	No	15 digits	No	8 places
1,500	Range: ± 999,999,999	Range: $\pm 10^{38}$ with 6 to 7 place accuracy.	Range: ± 99,999,999,999, 999.99	Fractions	Accepts several formats.
76	76 digits	No	No	No	Will include creation date and update date.
40	40 digits, treated same as character.	13 digits	Yes	No	Yes
9,999	9,999 digits	No	9,999 digits	Numeric accuracy to 14 digits	Accepts several formats.
70	± 32,768	No	Plus or minus 9.99999×10^{38}.	No	MM/DD/YY and DD/MM/YY
2,000	22 digits	No	Same as integer	No	Yes

Types/Sizes (cont'd)		Demo Version			Data Importing
Time	Logical	Available?	Cost	Limitations	
Not automatic	Not a default, but user definable	To dealers only	—	—	Standard. All-purpose sorting program. FORMSORT, imports, sorts and indexes a DIF or SDF file
No	No	No	—	—	SEQ
No	No	Yes	$85	Limited to 30 records.	Word processing files and non-delimited, zero-space-packed ASCII.
HH/MM/SS	No	Yes	$9.95 + shipping	Limited to two 40-record databases.	Special format: *Multiplan, Visicalc,* Lotus' *1-2-3, dBASE II,* and word processing packages such as *WordStar, MailMerge*
Will include creation time and update time	No	In development	—	—	SDF only with supporting *dBASE II* files; creates screen format at same time
No	No	No	—	—	DIF, 7 different ASCII styles.
No	No	Yes	$30	Limited to 15 records on output.	SDF, DIF, and comma-delimited ASCII.
No	No	To dealers only	—	Not learning device, only for demonstration of most routines.	DIF, Lotus' *1-2-3, VisiCalc, Supercalc, Multiplan.*
No	No	No	—	—	BASIC sequential file format

Data Exporting	Advanced Features				
	Back-up-Ability/ Copy Protection	Audit Trails		Data Restructuring	
		Pre/post imaging	Activity or transaction log	Technique (inherent/ separate program)	Adding or changing indexes
Yes	Not copy protected	No	Yes	Inherent, with FORMSORT.	Yes
SEQ, DIF, word processing interface for exporting data to *Magic Wand, WordPlus-PC, WordPerfect, Select, WordStar*	No automatic backup Files should be copied from inside TIM, but backing up can also be done from DOS with a small penalty	No	Yes	Must specify individual field names, even if identical	Yes, simple to do.
Nondelimited, zero-space-packed ASCII	Not copy protected	No	No	Separate module	Not without destruction of data
Standard· To other *R:BASE* systems or to mainframe *RIM* systems Special format same as importing	Not copy protected	No	Yes	The files may be restructured or combined through the use of several inherent techniques	Easy to do
Converts files to an ASCII format for loading and unloading into *dBASE II* or other programs	Automatic backup during data file reorganization. Limited error recovery	No	No	Inherent	Not applicable All sorts done on demand
DIF and 7 ASCII styles	Does backup and restore of special data and catalog files	No	No	Inherent, can add or delete fields at will	Limited
DIF and comma-delimited ASCII	Not copy protected	No	No	Inherent, through SQL language.	Yes, through SQL language and update utility
DIF and to other IT software.	Not copy protected	No	No	Inherent	Easy but slow
BASIC sequential file format	Not copy protected	No	No	Seperate, must write application to create new database	Secondary indexes available.

Adv. Features (cont'd)		Report Generation			
		Capabilities			
Linked or Multiple Update of Indexes and Files	High-level Language &/or Product Interface	Sorting	Aggregates (min, max, count, avg, percent, etc.)	Arithmetic (#, /, +, −)	Parameter passing
No, will not update more than one file at once.	*WordStar, CalcStar, PlanStar,* and *StarBurst.*	Up to 25 separate keys	Yes	Arithmetic and exponentiation	Yes. Maximum number of variables per report is 240.
Yes, can calculate new fields from existing fields.	No	Through indexes, each one of which can have up to 16 sort fields.	Total and average for each break of key field.	No	Yes, report headings and comparison values.
Yes, linked and global updates.	Links to Pascal program *Genie*	Up to 192 key fields; key fields can be concatenated fields.	Yes	Arithmetic and statistical functions	Yes
Yes, can specify a value or an algorithm to use for updating.	An optional programming interface is available from Microrim by separate purchase.	Yes, during queries, updates, and report printing, on up to 10 sort fields.	Aggregates, also will list numbers of occurrences of a particular value in a specified field.	Arithmetic, and date and time calculations.	Temporary variables may be defined for computing totals, subtotals, averages, and percentages of field values.
Yes, through calculation options.	Yes, *dBASE II.*	Up to 5 sort keys	Does counts	Yes	No
Yes	No	Up to 9 sort fields in free-form area and 9 more in columnar area.	No	Arithmetic and exponentiation	No
Yes, through SQL.	C language interface	Up to 5 sort fields	Yes	Yes	Yes, both internally and to C and assembler language programs.
Can update one file from a different file, but not all files at once.	See data importing and exporting.	Up to 9 sort fields	Yes	Arithmetic, standard deviation, and date calculation.	Can concatenate alphanumeric data from selected fields.
Yes	Canned applications planned	Up to 2 fields	Requires programming.	Yes	Range specification for any field

		Query Language			
Flexibility of output	Multifile access	Mass additions, deletions & updates	Load and unload	Execute stored scripts	Quality of output
Can end a page or report at time specified. Cannot send report to screen.	Yes, up to 16 files at once.	Yes, with batch mode.	Yes	No, but can with addition of MicroPro's *StarBurst*.	Good
Can specify column width and left margin only.	Yes, 2 files can be linked for reporting.	Yes	Yes	Yes	Good
Excellent, can display results in vertical bar charts, absolute numbers, or percentages.	Yes	Yes	Yes	Yes	All functions can be filtered through the criteria established by the query editor.
Very flexible; report formats are "painted."	Yes, via relational operations.	Not possible in report writer.	No	Yes, includes ability to nest command files up to 5 deep.	Excellent
Yes, labels and reports. Destination may be any combination of printer, screen, and disk file.	No	Yes	No	No	Fair
Has free form area for text or placement of fields.	Yes, via relational operations.	No	No	No	Good. Allows wide range of report options and does form letters.
Reports can be fully defined through SQL statements.	Yes, via relational operations.	Yes	Yes	Yes, multiple SQL commands can be stored.	Good. May use same report format for different files.
You can specify many aspects of report format.	Yes, from two files concurrently.	Yes	No	Yes	Good
Limited flexibility since table-driven.	Yes	No, but can be done with a BASIC program	No, but easily done with a BASIC program	No, all "programs" are table-driven.	Good quality

Report Generation (cont'd)					Procedural Language
Query (cont'd) Other	Report Formatter/ Generator	Screen Dumps	Other	Built-in Applications or Examples	
Up to 9 control breaks allowed.	Quick Report feature gives you preformatted report. Custom formatted report allows printing features such as boldface and underlining.	Yes	No	Quick Report	No
No	Limited; cannot use *TIM*'s multifile capabilities.	No	"Quick Print" dump of records.	Yes	No
Excellent print-formatting ability	Yes; report definitions can be saved and recalled.	Yes	Reports can include information from multiple files. Excellent print formatting ability.	Yes, but only as a tutorial.	No
No	Report formats are "painted" and stored for reuse.	No	No	No	No
No	"Painted"	Yes	Memos	5 samples	No
No	Free-form area of report makes it easy to simulate invoices and other forms.	No	No	No	No
Query language is part of SQL.	Part of SQL language	No	No	Example files on diskette and tutorial in manual	No
Up to 7 and/or conditions per select set.	Has custom and default formats.	No	No	No	No
No	Primitive	No	No	Yes	No

Performance Measurements

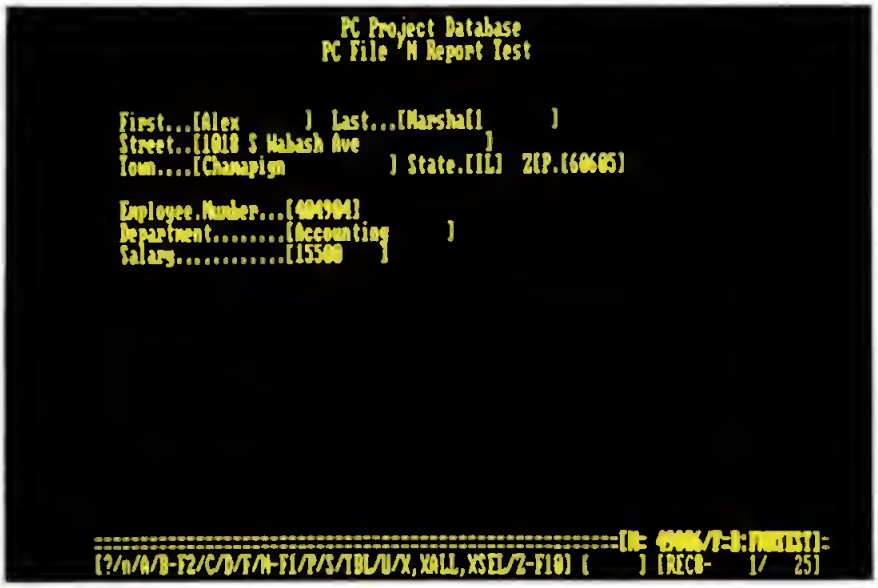
Time to Enter Standard Info	Time to Execute Standard Task	Time to Perform Sort	Time to Extract Random Records	Size of Database Created	
				Number of records in employee file	Space compression
2 minutes, 37 seconds	4 minutes, 52 seconds	2 minutes, 19 seconds for 1 key sort.	80 seconds on average	500 records=39,680 bytes.	No
Limited by typing speed.	Under 4 seconds	2 minutes, 23 seconds for sort on 2 fields.	Less than 4 seconds	500 records=58,368 bytes.	Upon request
15 minutes	11 minutes	6 minutes	20 seconds	500 records	No
4 minutes, 56 seconds	9 minutes, 19 seconds.	2 minutes, 38 seconds	13 seconds	500 records=59,904 bytes.	No, but can rewrite database to clean it up.
25 minutes	5 minutes	29 seconds for 25-record, 2-field deep sort.	2 seconds	25 records=3,328 bytes.	No
20 minutes	Currently has no provision for queries; must use series of screens	15 minutes; sort is part of custom report process.	No direct query method in current release.	500 records=72,000 bytes.	Yes
30 seconds	10 seconds	1 minute, 35 seconds	3 seconds on average	506 records=20,910 bytes.	No
1 minute, 5 seconds	6 minutes, 7 seconds.	1 minute, 11 seconds for 2-level sort	9 seconds	500 records=51,584 bytes	Yes
Limited by typing speed.	15 minutes; requires 5 passes through database.	20 minutes for 500 records.	3 seconds on average	25 records=2,652 bytes	No

Performance Measurements (cont'd)					Hardware/
Size (cont'd) Variable length of fields	Number & Size of Ancillary Files	Degradation with Additional Indexes	Time to Create a Standard Report to Screen	Time to Execute a Standard Report to Screen	Minimum Configuration Required
Yes	File definition file=1,920 bytes; Index=10,496 bytes.	Some degradation noted.	20 minutes	5 minutes, 31 seconds	96K, 1 drive, DOS 1.1
No	1 index file per index field, with 2 bytes per record.	Negligible	10 minutes	4 minutes, 20 seconds	128K, 2 drives, DOS 1.1
Yes	5 files, ranging in length from 512 to 57,856 bytes.	None detectable	5 minutes	8 minutes	128K for DOS 1.1, 192K for DOS 2.0, 2 drives.
No	Index file=8,704 bytes; data dictionary=9,600 bytes.	Some degradation noted.	3 minutes	Physical join=1 minute and execution=1 minute, for total of 2 minutes.	256K, 2 drives, DOS 1.1
No	Screen=4,736 bytes; report format=896 bytes; other=256 bytes.	—	1 minute, 30 seconds	14 minutes	64K, 1 drive, DOS 1.1
Yes	Has main file only.	Basically one index in traditional sense, but interrelated screen structure can simulate infinite number of keys.	Only a few minutes, once style is learned.	15 minutes	192K, 1 drive, DOS 2.0
Yes	Many ancillary files. Group 2 tasks and the *10 Base* program occupied all of 2 double-sided diskettes.	None detectable	1 minute	Under 1 minute	192K, 2 drives, DOS 2.0
No	Index=18,896 bytes; definition file=1,280 bytes; 4 others=128 bytes each.	Some degradation noted.	3 minutes	15 minutes	128K for DOS 1.x, 92K for DOS 2.x, 2 drives.
No	Has main files only.	No	15 minutes	5 minutes	128K, 1 drive, DOS 2.0

Software	Subjective Evaluations				
Configuration Used In Testing	Documentation	Program Robustness	Flexibility/Ease of Use	Would You Buy This One?	Would You Accept It as a Gift?
128K, 2 drives, DOS 2.0	Excellent	Very robust	Not easy to use, but extremely flexible. Same cursor manipulation as in *WordStar*.	No, too much input required. Few default operational setups required.	No
320K, 2 drives, DOS 2.0.	Good, gives information about file structure and a set of BASIC subroutines that assist in importing.	No problems in evidence	Good; many options for this type of product.	Would certainly consider it, though limited report formatting bothers me.	Yes
512K with Quadram quad disk, DOS 2.0	Extensive but uneven	The program sometimes quits if it receives a DOS message it doesn't like.	Flexible on a sophisticated level; would take a long time to know well.	Not this one; too limited.	No
256K, 2 drives, DOS 2.0.	Superb	Excellent	Easy to use and very flexible.	Yes, despite tremendous requirements of disk storage for operations.	Yes
192K, 2 drives, DOS 2.0.	Weak; poorly organized and presented, not clearly written.	Care is needed in some areas to avoid errors.	Extremely flexible, but not always easy to use.	Possibly; it has an excellent range of features.	Yes, certain features make it handy for some applications.
640K, 2 drives, DOS 2.0.	Fair to good. Nicely typeset, tabs, easel-type binder. Instructions are detailed, but no index.	Appears solid.	Excellent, but system is not really complete.	Will be a very good choice for beginner to intermediate users once system is completed by addition of Query and other features.	No, I still prefer *dBASE II* for flexibility and programmability.
512K, Quadram quad disk, DOS 2.0.	Excellent; contains illustrations, index, and tutorial.	Excellent. Well protected against errors, but may try to complete improperly described sorts.	The IBM SQL commands must be used for all significant actions. Experience and practice are needed to take full advantage of the language.	Yes, for files totaling over 400K.	Yes
128K, 2 drives, DOS 2.0.	Very good	Fair	Extremely easy to use; rather flexible. Can be used easily with many software products.	No, but I would if I were a businessman.	Yes, for business use.
256K, 2 drives, DOS 1.1.	Needs to be greatly clarified. Company promises improvements by release date.	Poor. The program often returns cursor to beginning of field without giving error message or beep.	Easy to use, *not* easy to learn.	No	No

PROJECT DATA BASE

PC-FILE 'N REPORT: A Diamond in the Rough



Data for one employee as seen in *PC-FILE 'N REPORT*.

PC FILE 'N REPORT is a young product that has many attractive features and shows signs of rapidly maturing into a solid and useful program. Released just last December, it has already been revised twice, with a third revision in the works.

Filing and reporting with *PC FILE 'N REPORT* begin with the creation of a data entry screen, which you design by "painting" the screen with fields. During this process, you have full-screen editing control and may use the cursor control keys and the Ins, Del, and Tab keys. One small quirk of the data entry screen is that the field titles must be attached by an unbroken string of characters to the brackets that define the field space. The manual suggests that you use periods. Although the periods appear on the data entry screen, they do not show up in printed reports. The three types of general fields are: alphabetic (A–Z only), alphanumeric, and numeric (0–9 only). For numeric data that display a decimal point or a minus sign, you must define the fields as alphanumeric, or *PC FILE 'N REPORT* will not accept the punctuation characters. There are four special field definitions that automatically stamp a record with the time and date of its creation or its last update.

The data entry procedure is generally smooth, once you get used to certain details. The cursor moves from field to field, advancing either when you press the Enter key or type a character in the last position in a field (such as the fifth digit in a ZIP code). The automatic movement of the cursor to the next field improves the speed of data entry by eliminating a keystroke, but you sacrifice the chance to edit what you have just typed. *PC FILE 'N REPORT* encourages high-speed data entry by "beeping" each time the cursor advances to the next field. The sound allows you to keep your eyes on the source documents, while you follow the progress on the screen with your ears. At first, I found the constant beeping to be annoying, but by the end of a short data entry session, the sound prompt proved helpful. (In the next release, the publisher is planning to give the user the option of turning this feature on and off.) In any case, the beep is distinctively different from an error message signal, and I quickly learned to tell the difference.

Another important aspect of data entry is that you must press the F1 key to record new records. If you fail to do so and continue typing away, you will write over the data that you entered for the previous record. As a result, you may end up not storing records you think you have entered. To help you avoid this situation, the data entry screen displays the total number of records in the file, making it

Filing and reporting with PC FILE 'N REPORT begin with the creation of a data entry screen, which you design by "painting" the screen with fields.

JASPIR International, Inc.
24 Salrit Ave.
Waldwick, NJ 07463
(201) 445-8535
List Price: $195
Description: Relational
Requires: 64K RAM, 1 disk drive, DOS 1.1.
Records per File: Limited by disk space.

CIRCLE 672 ON READER SERVICE CARD



possible to calculate the number of records actually added as compared to the number you meant to add.

One of the most powerful features of *PC FILE 'N REPORT* is its ability to perform table lookups during data entry. This feature gives it much of the power available in a more complex, hierarchical database management system. Apparently, it is possible to set up reference files not only to perform data entry verification but also to provide data for constructing records. You can, for instance, set up a system that requires you to enter only a customer's ZIP code and package weight. The program then checks the ZIP code against a table file to find the appropriate shipping zone, takes the package weight to another table file to find the appropriate shipping rate, brings this value back to the record, and uses it to compute the shipping costs automatically. In a few easy steps, you can have a total invoice cost, simply by providing the ZIP code and the package weight. In this same example, if you didn't know a customer's ZIP code, the system could access it through a customer number table file, which might also include the customer's name and address. This table lookup feature is extremely sophisticated and provides much of *PC FILE 'N REPORT*'s potential power.

Label Formats

The program's reporting capabilities go well beyond standard report formats. *PC FILE 'N REPORT* can also create complex "label" formats, which can be used not only for mailing labels and rotary file cards, but also, apparently, to perform calculations and full-page formatting. The manual includes samples of an invoice, a purchase order, and a billing statement, all of which were produced using label formats. The program even includes a simple text editor. You can create "memo files," which can be accessed in a variety of ways. But although one memo page can call another during the printing process, there does not appear to be any way to merge memos with database records to create form letters.

PC FILE 'N REPORT allows you to import data from *dBASE II* files. The process can also be reversed. In either case, conversions require both *PC FILE 'N REPORT* and *dBASE II* programs.

Reports may be sent to any combination of printer, screen, and disk file. Indeed, you can create ASCII files of the data for use with other programs. You also have many options for reorganizing your data files and for copying data from one file to another within *PC FILE 'N REPORT*. As a result, you are unlikely to ever get "caught" with your data in a format that no longer meets your needs.

Where the Problems Are

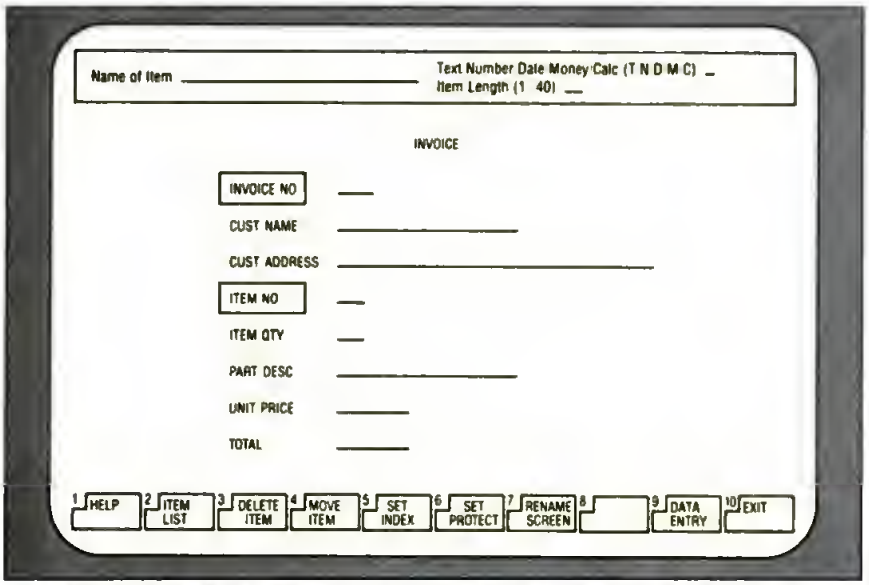
The biggest problem with *PC FILE 'N REPORT* is the user's manual. It has the unmistakable feel of programmer's prose, as it methodically marches through each menu item. There is a skimpy table of contents and no index; pages are typed—not typeset. The text is relieved by few graphic elements, and there are no tabbed dividers to aid in finding reference material quickly. The sample files provided on disk lack a tutorial to aid new users. The numerous screen prints, which should make learning easier, in fact create confusion because they come from more than one version of the program. (The publisher is working to revise the manual with the help of professional writers.)

The program's remaining flaws are comparatively slight. Most menus are a bit cluttered with options, and some of the command prompts and messages have a cryptic ring to them. The Function keys could have been put to more use to eliminate some of the details that the operator must now remember, especially in the data entry mode. In some instances, the program is not "case sensitive" (which means it doesn't care if you respond with A or a), but in most situations it is. These problems may be addressed in the revision currently in process.

In the final analysis, *PC FILE 'N REPORT* is a diamond in the rough. Many programs costing two to three times as much cannot do most of what *PC FILE 'N REPORT* can. Although it is still a bit difficult to work with, if you are willing to invest the time to learn how to make it perform for you, you should be well rewarded. **—Alfred Poor**

PROJECT DATA BASE

ASAP FIVE: A Work in Progress



In *ASAP FIVE*, the data entry screen can be designed; index fields (invoice and item numbers) are boxed.

ASAP FIVE is a simple and easy-to-use database management system with excellent human engineering and surprisingly sophisticated design features, but it has some omissions.

The program uses the relational model of data management, which has become popular in recent years for several good reasons, including ease of use, straightforward conceptualization of the data structure, and simplicity. Unlike some other Category 2 products, *ASAP FIVE* is a truly relational program rather than a simple file management system. It can also perform sophisticated relational tricks, such as forming virtual relations on the fly, that even some far more expensive programs can't manage.

ASAP FIVE maintains a complete Data Dictionary, another desirable feature that other relational products often do not incorporate. The system also maintains internal directories of data files, screen designs, and report layouts. These elements can have up to 20-character names, neatly circumventing the file-naming restrictions imposed by DOS.

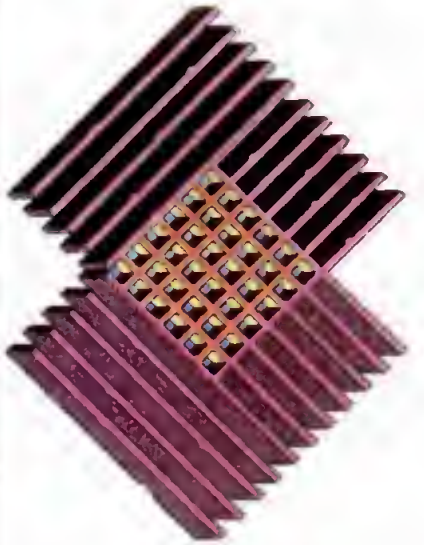
Most low-end and intermediate database managers are quite restrictive in the limitations they impose on the number of fields, files, and screens you can use; how many files can be open for reports; and the maximum size of a database. *ASAP FIVE* is unmatched in its ability to design and manage databases that are restricted only by available disk space. In fact, *ASAP FIVE* imposes *no* limits on the number of files in a database, how many fields a database can have, how big each record can be, how many records a file can contain or how many records a database can contain. This is truly exceptional, especially in a database obviously designed for the beginning to intermediate user.

ASAP FIVE is menu-driven; its command options are chosen from an unusually attractive sequence of menus. You cannot bypass the menu structure to issue direct commands. *ASAP FIVE* uses the ANSI.SYS driver for cursor control, so the system will only work with DOS 2.0 or higher. A side benefit of DOS 2.0 is the ability to have up to 99 files open simultaneously and to set up 20 disk buffers for improved performance, but DOS 1.1 users are out of luck.

Designer Screens

As with all database managers, the first step in using *ASAP FIVE* is designing the structure of the data files. You give each field a name of up to 20 characters (with embedded spaces allowed) and choose the type of data the field is to contain and how long it will be. Available data types include text (up to 40 characters), numeric (real with up to 13 digits), money, date, and calculated (a field generated by arithmetic manipulation of other fields).

The program places each field on the entry screen. The first few fields are dou-



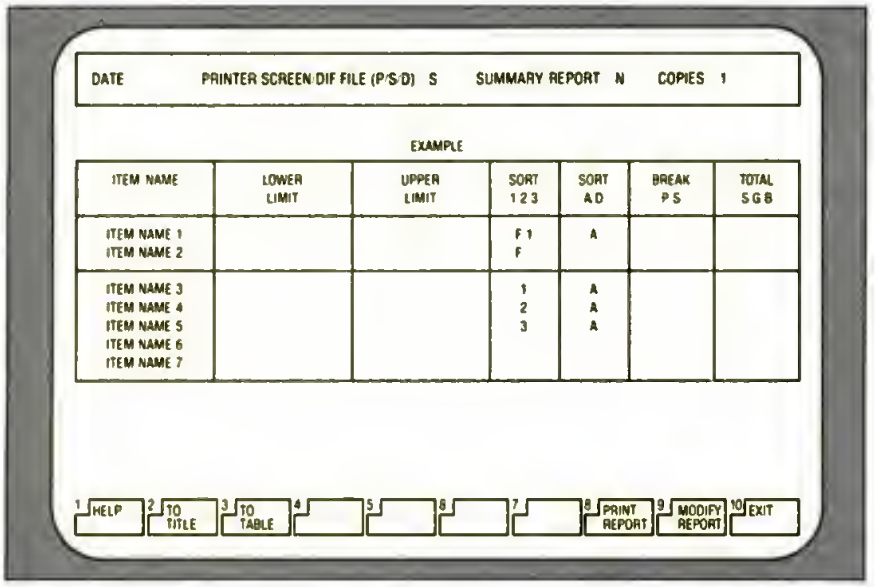
ASAP Systems, Inc.
2425 Porter St. #14
Soquel, CA 95073
(800) 345-2727
List Price: $395
Description: Relational
Requires: 192K RAM, 1 disk drive, DOS 2.0.
Records per File: Limited by disk space.

CIRCLE 673 ON READER SERVICE CARD

The Dilemma.

So now I have this computer in my office with word processing. But how do I get my computer to solve my OTHER business problems? Like sending out personalized form letters to the right people? Keeping track of my sales prospects and their potential? Reporting on inventory? Automating my billing system? How do I do all that? By myself? Right NOW? THERE'S GOTTA BE SOMETHING!!!





***ASAP FIVE*'s custom report function allows specification of ranges, sort fields, page breaks and totals.**

ble-spaced, but as the screen fills up they become single-spaced. If you enter even more fields, *ASAP FIVE* splits the screen vertically to make room on the display. A maximum of 40 fields can fit on one screen, but multiple screens can be designed to handle still more. You can move or delete fields with function keys.

The first field on the screen is automatically designated as an index, and you can specify two more fields as index fields. *ASAP FIVE*'s concept of an index is unique in that the three index fields are not truly separate indexes: They are more accurately viewed as one concatenated multiple index. Indexing in *ASAP FIVE* is actually much more sophisticated than mere field indexes, so this is not really a limitation. You can protect fields so that their contents cannot be changed during any subsequent editing function.

ASAP FIVE maintains all previously entered fields in its Data Dictionary, so the system knows about fields entered on other screens. If you enter a matching field name during screen creation, the system automatically fills in the field type and length. This is the first indication that anything special is happening in *ASAP FIVE*. The system design allows an almost infinite interlocking structure of display screens, each of which can update any other screen. Such "virtual relations" can result in extremely sophisticated multi-indexed data structures. A minor drawback is that it is not possible to use field names that have previously been defined for other purposes (for example, the field name CITY can't be used in different files with different lengths). This could get a bit sticky if a disk is to hold more than one database, but the power of the concept more than compensates for this inconvenience. Just keep separate disks for unrelated projects.

ASAP FIVE is a simple database management system with excellent human engineering and surprisingly sophisticated design features.

ASAP FIVE's Data Entry option is used both for data entry and editing existing data. Entering data is straightforward, with one nice touch: The contents of a field in the previously entered record is available at the touch of a function key, making entry of many records in a given state, for example, much easier. When you use the screen for editing, the previous and next records are available based on the contents of the first key field or one of the other two possible keys.

Unfortunately, *ASAP FIVE* has no query language or its equivalent. You cannot ask for a specific employee number or last name or make any ad hoc inquiry. This is a major omission. For one thing, it means you can't correct an error in an individual record without slowly approaching it one record at a time. A beta version of *ASAP FIVE* that I examined in addition to the current release showed a query option that was not implemented. However, by the time you read this article, a query module may be available.

A complex structure of interconnected screens could simulate or even be more powerful than a simple query module, and a sophisticated user can build some very impressive data manipulation designs. But this is probably beyond the capabilities of the less-experienced users who are the most natural target prospects for *ASAP FIVE*.

Quick and Custom

Things look up again when you move on to *ASAP FIVE*'s report generation facilities. Two main report options are provided: Quick Reports and Custom Reports. A Quick Report can display or print up to 39 fields associated with one data screen in a standard 8½-by-11-inch format. *ASAP FIVE* automatically formats a reasonably attractive columnar report. Each record will take as many lines as necessary; fields are not split. The report can be displayed

The Discovery.

InfoStar +, from MicroPro.
They say it'll solve all my
problems --easily.
Well, here goes...





More and more people in business are facing the same dilemma. And making the same discovery.

The dilemma is what software program will make that fancy new business computer perform all those useful business functions you were told it could perform when you bought it.

The discovery is InfoStar+ from MicroPro.

InfoStar+ allows you to turn your computer into an advanced information processor (the same way our best-selling WordStar® turns your computer into an advanced word processor).

With InfoStar+, you can sort your mailing lists, automate your billing system, organize and report your inventory—turn your mass of forms and paperwork into useful data.

You choose the information. InfoStar+ will sort and report it. Quickly and accurately. And all without the need of an expensive outside consultant to set it up, "program" it, or teach you or your employees how to use it.

The results? Just turn the page...

INFOSTAR™+ MicroPro.

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on the screen, printed, or converted to a standard DIF format file on disk.

ASAP FIVE's real reporting flexibility is in the Custom Report module. Creating a Custom Report is a two-step process. First you define the fields to be included and how you want to position them. *ASAP FIVE* sets up a one-line header with a date, title, and page number, a free-form area in which any text or field contents can be placed, and a normal columnar area for a table of output.

The free-form area is the star of the show. You use the cursor movement and editing keys to enter text or to position fields, which allows text to be entered in a primitive form of word processing—albeit without word wrap or other normal word processing features. *ASAP FIVE* can thus create custom form letters much like *MailMerge*. The free-form area is also terrific for creating forms such as invoices and other block designs or lengthy text headers for columnar reports.

The column area allows you to specify fields in any order but does not permit you to specify what column a field should start in. *ASAP FIVE* spreads the columns well, but more user control would be nice. In addition, you can move or delete fields; specify standard 8½-by-11-inch wide 132-column, or compressed wide reports; and insert or delete lines for neater formatting.

Once you have made these decisions, the second phase of the Custom Report definition process begins. A nicely formatted table appears that allows you to specify a wide range of report options. The report date, destination (screen, printer, or DIF file), report title, and number of copies you desire are input on one line. The table itself lists all the fields specified earlier. You can specify a lower limit and upper limit for each field; if both limits are the same, only records matching the given value will be included in the report. You can mark up to nine fields as sort keys in either ascending or descending order. A field can be marked as a Break field for a blank line or page eject, meaning that the specified action will take place when the value of the field changes. You can also request subtotals, grand totals, or both for any field. You choose these options by moving the cursor keys; the process is easy and straightforward.

Once you've made these choices, the report is generated. *ASAP FIVE* can take a while to begin its output (my sample report did not begin printing for 15 minutes). The pace is not due to sorting delays, as you might think; I tried the sample report with both two and three sort keys and the initial delay was identical. The delay occurs because *ASAP FIVE* formats the entire report before it begins printing, performing record extraction and other functions as it goes along.

ASAP FIVE maintains all previously entered fields in its Data Dictionary, so the system knows about fields entered on other screens.

In any event, the Custom Reports work exactly as expected. The ability to create form letters is most unusual in a database manager, and it works well.

Other Goodies

A special module can print mailing labels. The newest release of *ASAP FIVE* allows adjustments to handle labels of various sizes. The program handles only one-up labels and has no provisions for multiple two-, three-, or four-across labels. This is unfortunate, since multiple labels are easier to print and more reliable than one-ups.

The final *ASAP FIVE* modules handle backup and restoring of *ASAP* files. The system uses DOS' facilities in this area and works fine.

As I mentioned, *ASAP FIVE* can create DIF files from both its Quick and Custom Report modules. The current release can also import data stored in DIF format from programs like *1-2-3* and *VisiCalc*. The beta version included the most flexible import/export provisions I have seen. In addition to DIF files, the new version could import or export in any of seven ASCII formats, including BASIC, COBOL, *MailMerge*, and other fixed-position and comma-delimited styles. The ones I tried were easy to use and worked well, although they were slower than DIF file translation.

ASAP is one of the few software houses I know that maintains a toll-free number for user questions and support. The support staff is knowledgeable and patient.

The documentation is reasonably good as well. It is attractively typeset with a good set of tabs, and the easel-type binder is excellent. The text itself is on the terse side, however, and there should be more examples and tutorial material in a manual targeted to beginners.

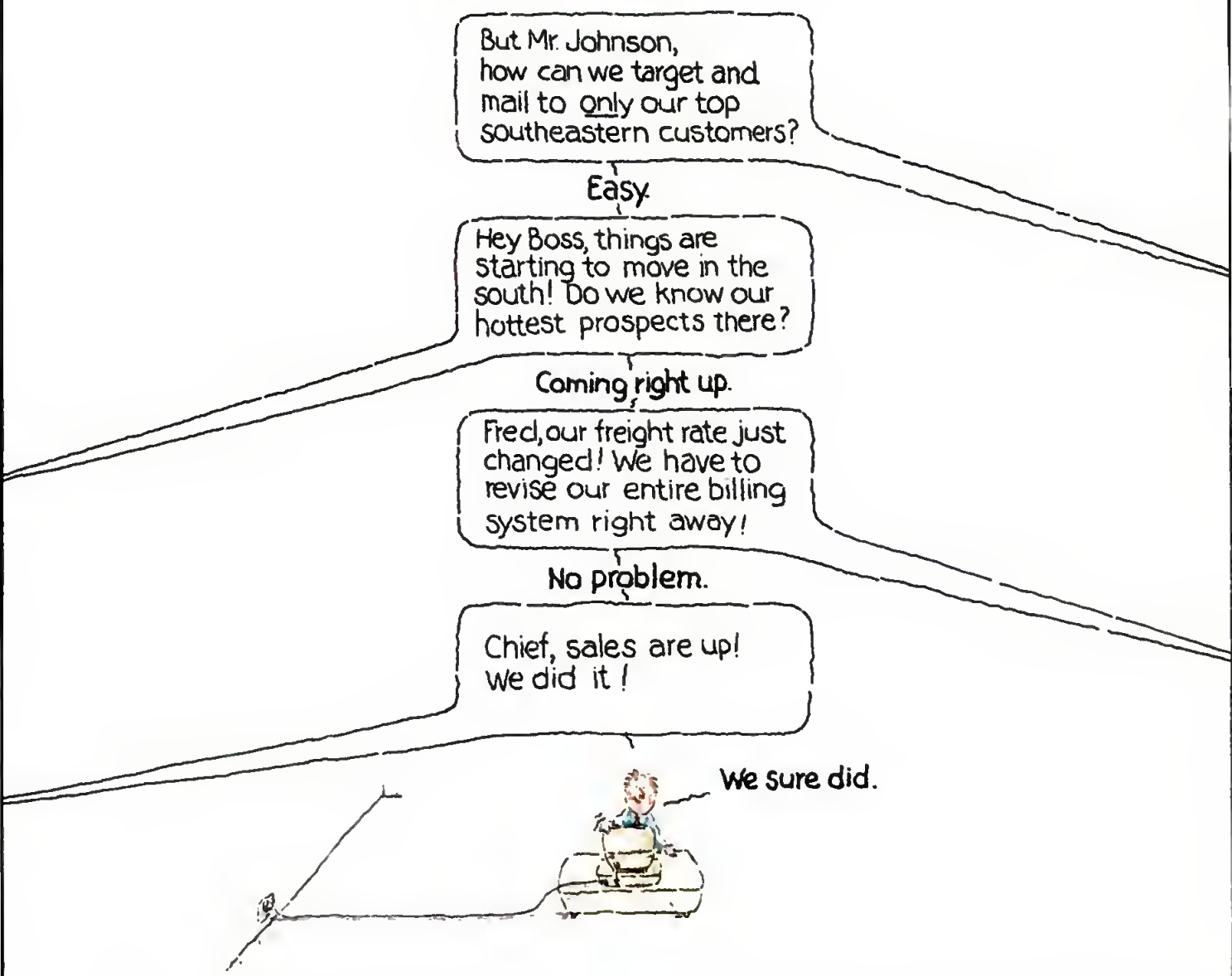
ASAP FIVE is an elegant system to look at and to use. The virtual relation capability is quite unusual for a product in this class, and it's easy to use.

The lack of a query module is a significant weakness that should be corrected soon. The program is reasonably fast, considering it is written in C rather than assembly language, but there is quite a bit of code in the total system. *ASAP FIVE* runs well on floppies, but like most database managers it is much happier on a hard disk.

I am tempted to think of *ASAP FIVE* as a "work in progress." While I don't mean to imply that the program is not usable as is, I feel that it may evolve into something quite special in time. *ASAP FIVE* certainly merits serious consideration in its class, but it is also a product to keep your eye on in the future. **—Glenn A. Hart**

(continued)

The Reward.



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CIRCLE 231 ON READER SERVICE CARD

10 BASE: Flexible Power



lname	number	deptnr	depname
Adams	124800	400	Production
Ames	126340	100	Accounting
Anderson	125780	300	Marketing
Anderson	126480	300	Marketing
Armstrong	128580	300	Marketing
Bakaloff	129280	300	Marketing
Banning	120530	300	Marketing
Barbour	125500	400	Production
Barclay	126760	200	Data Processing
Bayliss	122420	500	Shipping
Beckwith	123260	200	Data Processing
Bendursky	123610	200	Data Processing
Bernowski	125570	500	Shipping
Bittner	122490	100	Accounting
Blander	120370	500	Shipping
Blue	124870	500	Shipping
Bower	125290	100	Accounting
Bradford	120810	200	Data Processing
Brady	121160	200	Data Processing

F5-Back F9-More

A *10 BASE* report, displaying department names from the department file and alphabetized by employee last names.

If you list the positive and negative features of the *10 BASE* database management system, the positive list is quite long and the negative list is quite short. But the two lists have one major item in common. The good news about *10 BASE* is that it is completely based on the IBM SQL database management programming language—that's also the bad news.

SQL is a well-defined, higher-order language designed especially for DBMS work. Its most common use is on IBM mainframe computer systems. In the *10 BASE* version, it has only 11 commands to remember; and the construction of these commands is very simple compared to many other languages. The commands are all English statements, which include SELECT, ASSIGN, INSERT, DELETE, UPDATE, FORMAT, CREATE, MODIFY, DROP, and REORGANIZE. The commands make sense, and they are easy to link together with auxiliary words such as INTO, WHERE, and ON. When you create a database with SQL (pronounced "see-kwul" by insiders), you have great flexibility and power.

The program makes good use of the PC's keyboard—all of the cursor and editing keys are available to help you enter and edit SQL statements. The special-function keys are used for several useful purposes, and their assigned functions remain the same no matter where you are in the program.

But when you start to create a database with SQL, you are faced with the most intimidating situation in the world of man/machine relations: a blinking cursor and a blank screen. You are expected to know where to start. This blank screen stares at you many times when you use *10 BASE*, so if you aren't the type who likes to press ahead, you might be better off with some kind of menu-driven system. If, however, you see a blank screen as an opportunity to design things the way you want them, then *10 BASE* has the power to let you grow.

The growth potential of *10 BASE* is an important part of the program. Its distributor, Fox Research, Inc., has integrated *10 BASE* with a local area network for the PC called *10 NET* that makes the program into a true multi-user database system. The local area network system also adds security features that the single-user version of *10 BASE* lacks.

Another advantage of *10 BASE* is that it allows you to start small. The program costs only $495, which, considering its power, is an excellent price. You can quickly learn to write simple requests for information using SQL. A statement such as SELECT CHECKNUM, CHECKAMT, PAYEE FROM CHECKREG PRINT. will print a report showing the number, amount, and payee of all checks in a file called CHECKREG. If you add WHERE MONTH - 04, you will get only the checks written in April. Much more complex relationships can be expressed with only a few more words. The power of *10 BASE* can grow as your needs and mastery of the SQL language grow, but you must be willing and able to write the code to get the results.

10 BASE has very few limitations for the experienced programmer. It has few internal limits, and since you can use up to 16 files of unlimited length simultaneously, you will run out of disk storage space before you exceed the program's capabilities.

Everything in *10 BASE* revolves around the SQL statements. An important program function allows you to save these statements using any name you like and then recall them with the touch of a key. You can re-create reports whenever you

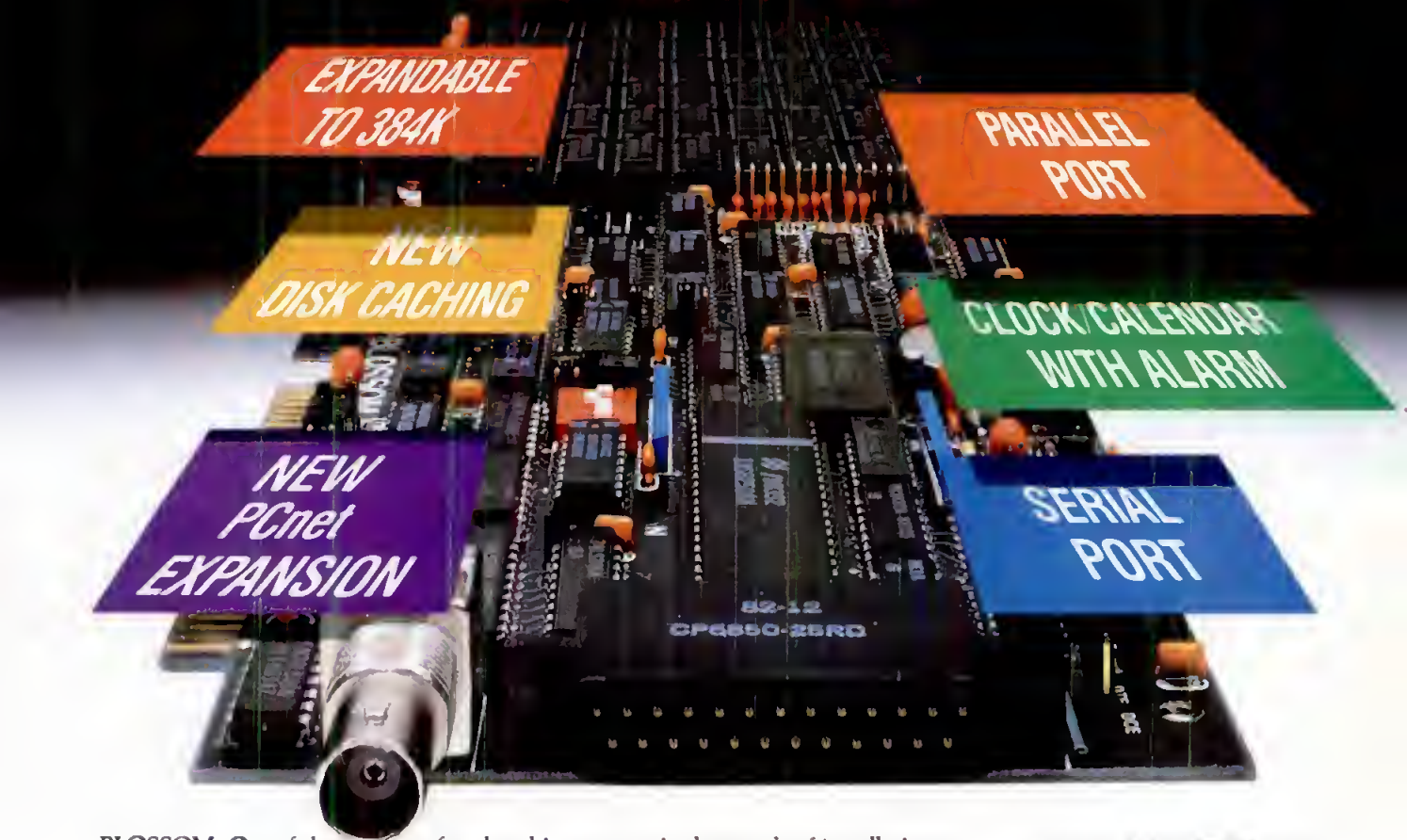
10 BASE
Fox Research, Inc.
7005 Corporate Way
Dayton, OH 45459
(513) 433-2238
List Price: $495
Description: Relational
Requires: 192K RAM, 2 disk drives, DOS 2.0.
Records per File: Limited by disk space.

CIRCLE 674 ON READER SERVICE CARD

BLOSSOM™

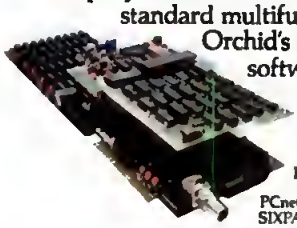
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CIRCLE 123 ON READER SERVICE CARD

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need them simply by touching the F8 key, entering the name of the command file, and touching the F1 key. You can repeat many other complex command sequences this way; the function saves you a great deal of time and allows you to build a unique library of prestored command lines that can be called and executed with just a few keystrokes.

Designing the Database

The *10 BASE* manual refers to relational files as tables. The table creation function in *10 BASE* allows you to write SQL commands describing the fields in the table, their length, and three data types: character, numeric, and integer. At some later time, you can specify which fields you want to act as keys and you can change them whenever you like. You can change the field length at any time, but you can't switch the identification of fields between character and numeric. (This limitation is only a problem if you find, for example, that the people who provided the data did something unfortunate like designating the zip code field as character instead of numeric.)

The latest version of *10 BASE* includes a form generation utility that allows you to "paint" the form on the screen along with titles, instructions, and names representing the blanks on the form. You can create forms for either input or output. You can also link the form to specific help screens in the *10 BASE* Help file, so if another user asks for help while using the form, he will see the screen or screens you have designated. This forms creation utility does not, however, automatically link into the data table you have created. You have to write a SQL statement that equates the blanks in the form to the fields of the table. The utility is valuable if you are designing a database system for use by inexperienced people, but it can be ignored if the user can work with a screen that only contains short field names or if you import your data from existing files.

The *10 BASE* package contains a very nice "bridging" utility that allows you to read and create files in the common DIF and comma-delimited ASCII file formats. It is menu driven and very easy to use. It includes error codes that tell you (in general terms) if the files you are importing don't fit into the data table you have created.

The SQL statements used to make inquiries into the database are easy to write once you know the construction to use, but they must be accurate both in syntax and logic. The program checks for proper syntax and will tell you if you made an error, but it will try and work on tasks you write (sometimes endlessly) if the logic is not correct.



The good news about 10 BASE is that it is based on SQL—that's also the bad news.

During the filling of complex data retrieval requests involving multiple fields in multiple tables, the speed of the program often depends on how you phrase the commands. When I did the standard *PC Magazine* tasks with *10 BASE*, I found it was easy to join the two tables into one and search through the new combined table. An alternative was to write an SQL statement that searched through and compared every field of each table, but the retrieval time for this process would have been many times longer.

The *10 BASE* FORMAT command allows you to create a document with headings, column names, numbers formatted uniformly, and special data categories such as totals and subtotals. Once you create a format, it can be saved under any name you choose and then that name can be included as part of a SELECT command. This useful feature permits you to use the same standard format for reports that may cover many different files.

10 BASE has tables and working areas that can be accessed by programs written in C or assembly language. You can construct and use a special table as an input/output point for another application program. The DBMS and the application program can both read and write to the table and see one another's data. *10 BASE* uses the work area to keep information between calls. It can be read by an applications program, but it should not be modified.

Documentation

The *10 BASE* manual contains a good index and sections including both a detailed description of each command in alphabetical order (like the IBM DOS manual) and more general sections on programming and database design. The manual also includes a tutorial that I found very helpful. A quick reference sheet gives examples of the SQL commands and their use and can take a little of the terror away from that blank screen and blinking cursor.

10 BASE is powerful and well priced. It lacks some of the statistical capabilities of other systems with otherwise equal manipulative power, but if you are more interested in names than numbers it is terrifically flexible. The SQL language can be intimidating at first, but with a little practice it becomes faster and more natural to use than structured menus. *10 BASE*'s potential for growth makes it my choice for large-scale business applications.

—Frank Derfler

(continued)



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CIRCLE 122 ON READER SERVICE CARD

KeepIT: Friendly and Flexible

Lastnam	Dept:num	Deptnam
Adams	300	Marketing
Adams	400	Production
Adams	200	Data Processing
Ames	500	Shipping
Ames	100	Accounting
Anderson	200	Data Processing
Anderson	200	Data Processing
Anderson	300	Marketing
Anderson	300	Marketing
Armstrong	200	Data Processing
Armstrong	300	Marketing
Austin	500	Shipping
Austin	100	Accounting
Bakaloff	200	Data Processing
Bakaloff	300	Marketing
Banning	300	Marketing

A *KeepIT* report showing employee names and departments and alphabetized by employee last names.

KeepIT is the heart of ITSoftware's IT Series of integrated programs. It comes with a thick manual in an IBM-style three-ring binder and four disks (one of them with several interface programs for other IT software) packed solid with data management routines. The documentation is neatly printed on semigloss paper. Much care has apparently gone into making *KeepIT* one of the more easily mastered relational data management systems.

About a quarter of the manual is devoted to a primer that provides a good, if superficial, overview of *KeepIT* procedures. There is no reference section as such, but the index and glossary are more than adequate, and you can use the main section of the manual as an in-depth teaching tool as well as to look up details of procedures. The novice should be able to set up a database and manipulate it with some confidence within a few hours, which doesn't mean that *KeepIT* is short on features. Through use of extensive menus and easily modified default conditions, *KeepIT* will make you feel it is running on automatic most of the time. Special routines such as report and list formats, read data specifications, compute/fill parameters, and interfaces with other programs can be saved and listed in a catalog. You can also create command files that will perform complicated but repetitive tasks utilizing several of the cataloged routines.

KeepIt's main menu will be unusually satisfying to database users now struggling with command-driven data managers. Its 30 options are neatly laid out, and you choose them by typing a combination of two letters or by moving an inverse video bar to your section with the cursor control keys and then tapping the Return key. The main menu allows you to choose modules for entering, changing, importing, sorting, and viewing data; defining the file or entry form constraints and fill values, designing and printing reports or labels, redirection of printer output, file management, creation of indexes, and accessing interfaces with other IT programs. Submenus, fill-in-the-blanks, and yes-or-no questions take you smoothly through each separate routine.

New data files are defined at the same time as you design data entry forms.



Much care has apparently gone into making KeepIT one of the more easily mastered relational data management systems.

ITSoftware
P.O. Box 2392
Princeton, NJ 08540
(800) 222-0592
List Price: $450
Description: Relational
Requires: 128K RAM (DOS 1.x), 192K RAM (DOS 2.x), 2 disk drives.
Records per File: 32,767

CIRCLE 676 ON READER SERVICE CARD

Instead of actually painting the entry form on the screen, you fill in prompted information about each field, including a prompt you can specify and each field's position. Nine pages are allowed for each form, and you can call up a display of the developing entry form as you go along. When you are finished, you can move the fields to areas on the form other than their default positions (to the right of the prompt). *KeepIT* does not give you the same degree of flexibility in creating entry forms that other data managers do, nor does it allow horizontal scrolling to create forms as wide as the paper ones you may be using now. You also cannot add to the entry form either extra titles or special information for the user. For most tasks, however, *KeepIt* data entry forms are perfectly adequate.

Compute and Fill

KeepIT has excellent compute and fill facilities. You can concatenate alphanumeric fields and write them to a third field, do global updating with computed fields, and work with dates by adding or subtracting days to or from a date, subtracting a date from another to get the number of days between them, or comparing two dates and keeping only the more recent one. For statistics, *KeepIT* can give you a count of alphanumeric records and produce sums, averages, standard deviations, and maximums and minimums of numeric values. It can produce mailing labels and lists with special functions usually associated with specialized mailing list programs. You can specify number of lines to be printed per label (up to eight), up to five labels across, column to start printing, horizontal and vertical space between labels, truncation length of fields, and commas automatically inserted after certain fields. *KeepIT* will even close up empty fields like a second address line on your labels.

Reports can be directed to printer, screen, or a disk file. You cannot design the actual report format by moving the cursor over a blank screen; *KeepIT* prompts you for information on report format and the fields reported including line skip, subtotals for columns or rows, statistics, suppression of column heading or repeated values or blank lines, truncation of fields, and select conditions for output of values by arithmetic or logical operators or wild cards. Up to 25 lines are available for output of single records; you merely inform *KeepIT* of the line on which you want each field value to be printed and exactly where on the line this value should appear. The report printout includes page numbers and, in the upper right, any two-line title of up to 40 characters per line that you specify.

KeepIT is especially well suited to be a central software package in an integrated system. You can create any sort of new file from two others and output it to other IT Series programs.

Relational operations may be performed in either of two ways. If you have sorted previously, you can link two files in a report (a dynamic join) to get output of fields from both files. Alternatively, you can create a third file (a physical join) in the File Management module, sort it later, and prepare a report from this. Sorting is not a part of report creation; it is a separate but very fast operation. Potential purchasers of the *KeepIT* database management system should remember that in sorting large data files (over 500K), *KeepIT* requires about the same number of bytes as the data file itself. You can insert a sorting "work disk" in place of the *KeepIT* system disk when dealing with floppies, but you should keep an empty space on your floppy or hard disk equal in size to your largest file for sorting it.

KeepIT is especially well suited to be a central software package in an integrated system. You can create any sort of new file from two others and output it to other IT Series programs for spreadsheet analysis, graphics, mail list, forms, statistics and word processing. Data can also be output to *1-2-3*, *UltraCalc*, *EagleCalc*, *SuperCalc*, *Multiplan*, *WordStar*, *WordPlus-PC*, *WordPerfect*, *Wordix*, *PeachText*, *EasyWriterII/EasyFiler*, and *Spellbinder*.

Accomplishing the first *PC Magazine* test, an ad hoc query of two files extracting fields from both, was very easy. *KeepIT*'s report module simply asked for appropriate format and field parameters, including which fields were from the originating file and which from the linked file. The second test required the creation of a large third file by joining the two original files. I first created a new file-definition file by copying (with the Copy Files module) the Person file-definition file to a disk file renamed Task2. I then added additional fields to the data entry form through the entry form/file-definition screen in the File Definition module. I sorted the large Task2 file on two levels in the Sort module and then rapidly produced a report format to output all information in the new file. The generation, sorting, and output to screen of the Task2 file took quite a long time but was simple. Creating the report itself, frequently a long and tedious affair with other data managers, was quick and simple with *KeepIT*.

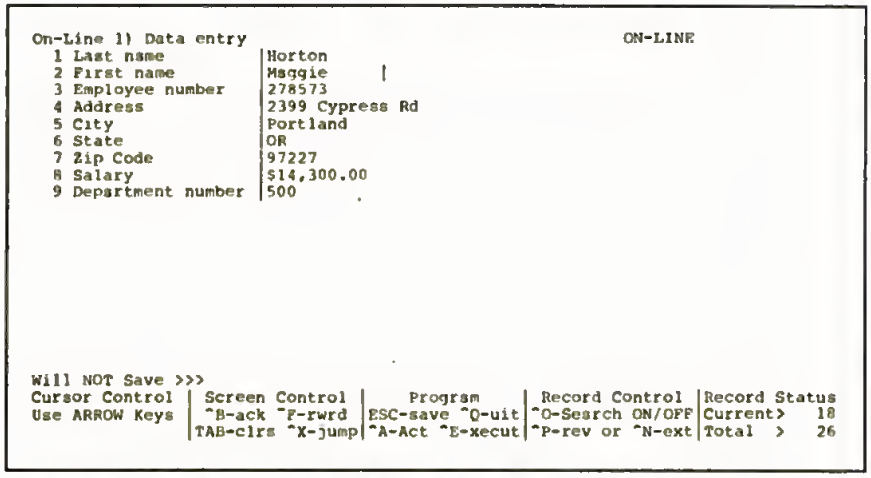
KeepIT relational operations are flexible, but I doubt that their execution will be difficult for a novice. The program ranks high in combining ease of use, flexibility, and restraint in demands on hardware.

—Richard Zander

(continued)

PROJECT DATA BASE

KeyBase: Arrested Development



A completed employee record as it appears in *KeyBase*. Note list of control key definitions at bottom of screen.

The *KeyBase* database design and management system is a clever application generator marred by a cryptic interface and abysmal documentation. It's the most ambitious product yet from SoftKey, which markets a line of programs including *KeyChart*, *KeyPrint*, and *KeyMailer*.

KeyBase evolved from *NUCLEUS*, a primitive applications generator created several years ago by Terry Barratt, a young Canadian. He bought an Osborne 1 and sat down to design a system that would automate 80 percent of the paperwork in his clients' offices. *NUCLEUS* spawned its own programs in the form of procedure tables. These encoded tables, used in conjunction with canned run-time functions called ON-LINE, REPORT, SORT, and PURGE, simulated applications that might ordinarily have taken months to develop if programmed individually.

NUCLEUS went through two revisions and was popular in the Toronto area, where it was available through Barratt's company, BASIC Assist. Barratt was able to make Version 4.0 PC-compatible, and he called in SoftKey to market it under the name *KeyBase*. Somewhere in the translation, though, Barratt's beautiful brainchild has grown into an ugly teenager.

Software Products, Inc.
2727 Walsh Ave.
Santa Clara, CA 95051
(408) 986-8148
List Price: $375
Description: Relational
Requires: 128K RAM, 1 disk drive, DOS 2.x.
Records per File: 32,000

CIRCLE 677 ON READER SERVICE CARD

Eight-Bit Genes

First of all, *KeyBase* clearly shows its 8-bit ancestry. In fact, no apparent effort has been made by Barratt or anyone else to convince this little program that it has a whole new world of memory to play in. Instead of commands, *KeyBase* gives you cryptic control sequences. Instead of helpful prompts, you get oblique one-liners like:

```
ESC-End CHG/DISK-^D or Select !?!
```

KeyBase exploits few of the extraordinary powers of the IBM keyboard. It uses none of the function keys, and the way it uses other special keys is bizarre. To tab to the next field, use the right cursor key; to clear the screen, use Tab. To insert text, use Ctrl-I: to delete, use Ctrl-G. To enter Data, hit the Enter key first, then key it in, then hit Enter again. You exit various program phases via Ctrl-C, Ctrl-E, Ctrl-Q, END, Enter, or Esc. This nonsense may have been par for the course on an Osborne I, but on the PC it's just a sand-trap.

Other problems date back to *NUCLEUS*. The most confusing aspect of *KeyBase*'s often clever design is what Barratt calls *modes*. These are assigned to display screens and fields and seem to imply functional permissions. Mode 1 allows only existing records to be accessed. Mode 2 assigned to a field means data entry is required. Mode 3 supports existing records whose key is supplied via a transfer operation. Mode 4 automatically runs the associated actions while on-line. There are eight of these modes, and each is nastier and more abstract than the last.

KeyBase's unique capability to add and subtract *alphanumeric* fields sounds like great news, but this turns out to be yet another vulgarization of language. Addition is defined here as string concatenation with optional blank compression, which at least has parallels in classical programming languages. But the subtraction function will try to convince you that "No Good" minus "Bad" equals "Good."

The program has minor annoyances as well. The installation instructions for *KeyBase* violate all generally accepted standards of safety by insisting that you should not write-protect the master copy before running a batch file that writes to it. Any properly designed installation procedure will insist that you make a copy of the master, put the master in some safe place, and then run the INSTALL.BAT program on the copy.

The Written Word

KeyBase's documentation is the worst I have ever seen. It seems to have been transcribed—by someone totally unfamiliar with English punctuation—from a hissing

tape made by a rambling techie deep into a blind drunk. Just try reading 163 pages of teeny, tiny print that begins: "*KeyBase* is unlike other Database Managers. It is also unlike any General Purpose File Manager.



KeyBase is a product with real potential. It could be a boon to thousands of small businesses and probably will be someday.

That makes *KeyBase* different from anything else to date."

Add to that Guinness record-breaker such exalted hyperbole as, "As you can see, with *KeyBase*'s capability to link Action with Displays, almost anything can be accomplished when working with Databases." Shouldn't somebody tell the president?

The author of this document has chosen to capitalize about every fourth word. In English, unlike, for example, German, capitalization is intended to identify proper nouns. Here, however, it is often used for mere emphasis. Even Verbs sometimes Get this treatment. After I Had Spent 2 days, Wading through this stuff, I Learned to completely Ignore the nutty Punctuation.

The tutorial is buried in the appendix, and you are warned not to read it before comprehending the rest of the manual. But I finally discovered a simple way to master *KeyBase:* I merely kept Barratt on the phone for 4 hours and made him guide me step-by-step through the design and execution phases of a sample database application. It was amazing how the thing submitted to his long-distance instructions when it hadn't done anything for me but snicker. I was finally able to see just how many clever things *KeyBase* can do, and I learned a great deal about its theory of operation as well.

For instance, *KeyBase* uses a binary search to access records directly. That means that records must be fixed length, as in most other database systems, and trailing blanks can't be truncated to save space. Furthermore, if you have duplicate keys you aren't guaranteed to access the first duplicate first, though browsing via Ctrl-P (prior) and Ctrl-N (next) will orient you soon enough. Although the manual says that you can find any record in 10,000 within around 15 tries, this can't compare with a file with two or more levels of indexing.

In order to import data into the system you need to start each field on a fixed column boundary and see to it, somehow, that each entire record is surrounded by quotation marks. Then you must add a header record of the form

```
i,k,"
```

where i and k (called the SORTED and SERIAL markers) give the number of sorted records and the total number of records respectively. The empty string simply forces the record length to be equal to all the other records in the file. If the binary search fails, the markers tell the program to serially search any records appended after the last sort.

Several days before going to press, incidentally, SoftKey surprised us with the news that the product it had sent for review would be greatly improved before being released this summer. That was a good one on us—*PC Magazine* prefers to review products that people can actually purchase. However, it did help to explain why only the second of the two "Corrected diskettes" I received allowed me to to do any useful work at all with *KeyBase*.

KeyBase is a product with real potential. A labor of love, finely honed by a man with a solid understanding of garden variety paperwork, it could be a boon to thousands of small businesses and probably will be someday. For now, however, it is trapped in that corner of time and space known as the arrested development zone.—**Dean Hannotte**

```
Field Dictionary 1) Data entry                                    ON-LINE
   Prompt                    Help Message    Size Type  Display Format

  1Last name                                   15    A
  2First name                                  11    A
  3Employee number                              6    N    ######
  4Address                                     3D    A
  5City                                        2D    A
  6State                     Two-letter abbr   2    A
  7Zip Code                                     5    N    #####
  8Salary                    Max=$99,999.99    8    D2   $##,###.##
  9Department number         3-digits          3    N    ###
 10Department number                          3    N    ###
Prompt       = simple text as Field Identifier
Size column  = Field length 1-20DD characters
Type column  = A-alphanumerics  N or N# for Numerics  D or D# for Dollars
Format       = ($),(#),(,),(.),(-) for Numerics  any Characters for Alphas


Cursor Movement  | Definition  | Special Function | Exit to Menu
                 | ^G-delete   |  ^Y-get Fields   |
Use ARROW Keys   | ^I-insert   | ^T-test Dis/Prt  | ^B-ack to Menu
[RET]-Enter      | ^R-eplicate |  ^P-print Dict   |
Maximum Nbr Allowed/Spec | 10D / 12
```

***KeyBase*'s dictionary of fields, showing aspects specified by user.**

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- ☐ 4. Transportation
- ☐ 5. Communications
- ☐ 6. Utilities
- ☐ 7. Computer related retailer
- ☐ 8. Non-computer related retailer or wholesaler
- ☐ 9. Finance, banking, insurance, real estate
- ☐ 10. Health, medical service
- ☐ 11. Legal
- ☐ 12. Education
- ☐ 13. Data processing, computer service
- ☐ 14. Other business services
- ☐ 15. Government
- ☐ 16. Consultant
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- ☐ 13. Dir/Mgr Systems & Procedures
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- ☐ 24. Systems Engineer
- ☐ 25. Design/Production/Research Engineer
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☐ Yes (If yes, please report accurately below for the two largest.)
☐ No

Manufacturer	Model	Quantity

IBM or Compatible Personal (Micro) Computer Information for this location:

(Please report accurately for each model indicated)

Manufacturer's Name, Model	6. Currently Owned (Quantity)	7. Plan To Purchase Within: 0-12 Months (Quantity)	13-24 Months (Quantity)	25-36 Months (Quantity)
IBM PC				
IBM PC XT				
IBM XT/370				
IBM PC/3270				
IBM PCjr				
IBM Compatibles (Compaq, Eagle, etc.)				
Other (Not IBM or Compatibles)				

7a. In which of the following ways are you yourself involved with the *Personal (Micro) Computers* at your location?

- ☐ A. Use them
- ☐ B. Recommend them
- ☐ C. Establish specifications
- ☐ D. Approve purchase
- ☐ E. Acquire them
- ☐ F. Other involvement (specify) _____
- ☐ G. No involvement

8. The *Personal (Micro) Computers* purchased for this location would be:

- ☐ 1. For internal use
- ☐ 2. For resale
- ☐ 3. Other (please specify) _____

Full company name and company address must appear in spaces below for application to be processed.

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Title

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Division | Telephone Number

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Company City | State | Zip

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- ☐ E. System house
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8. Please indicate below the communications capability for which these *Personal (Micro) Computers* are used.

- ☐ A. Communicate with remote timesharing or database.
- ☐ B. Communicate with internal mainframe or minicomputer.
- ☐ C. Used in local area network.
- ☐ D. Down load data from mainframe or remote service.
- ☐ E. None of the above.

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- ☐ 18. Word Processing
- ☐ 19. Other _____

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☐ Yes (If yes, please check all that apply)
☐ No.

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- ☐ 1. Mainframe
- ☐ 2. Minicomputer
- ☐ 3. Personal (Micro)

Peripheral Equipment
- ☐ 7. Letter Quality Printer
- ☐ 8. Graphics Printer
- ☐ 9. High Speed Printer
- ☐ 10. Color Monitor
- ☐ 11. Monochrome Displays
- ☐ 12. Modems
- ☐ 13. Hard Disk
- ☐ 14. Tape Backup System
- ☐ 15. CPU Compatibility Card
- ☐ 16. Memory Board
- ☐ 17. Communications Port
- ☐ 18. Plotters/Charting Devices
- ☐ 19. Local Area Networks

Software Packages
- ☐ 21. Communications
- ☐ 22. Accounting
- ☐ 23. Order Entry/Inventory
- ☐ 24. Payroll
- ☐ 25. Time Billing
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- ☐ 28. Word Processors
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- ☐ 31. Program Developers/Generator Tools
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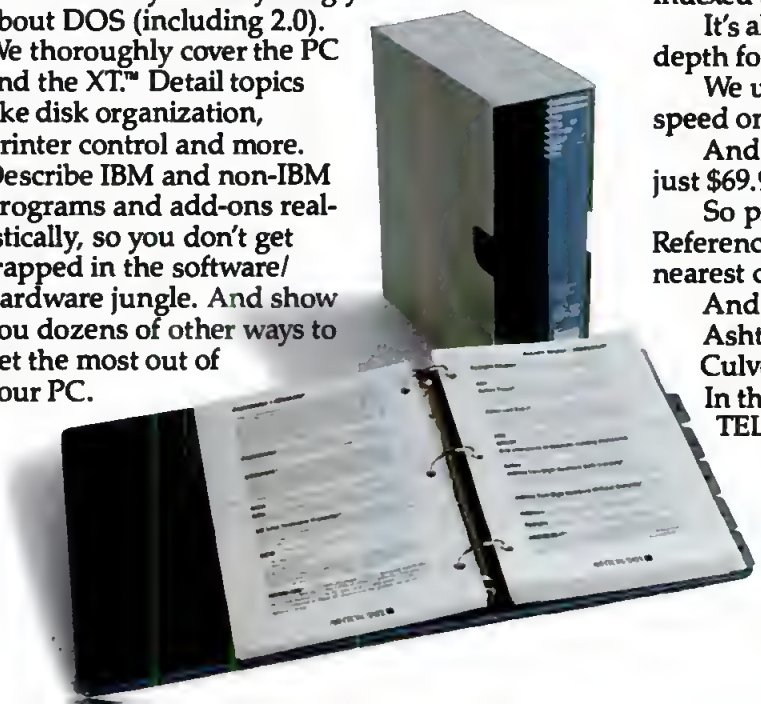
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An Automatic Approach to Networks

PFS:ACCESS is a handy program for informational database subscribers. Teach it to sign on to your network and it will take over and do the job for you.

Immediate access to all sorts of business, leisure, and news information at the touch of a finger is something no true executive can resist. *PFS:ACCESS* is a new software package that further streamlines the connection between users and the networks to which they subscribe.

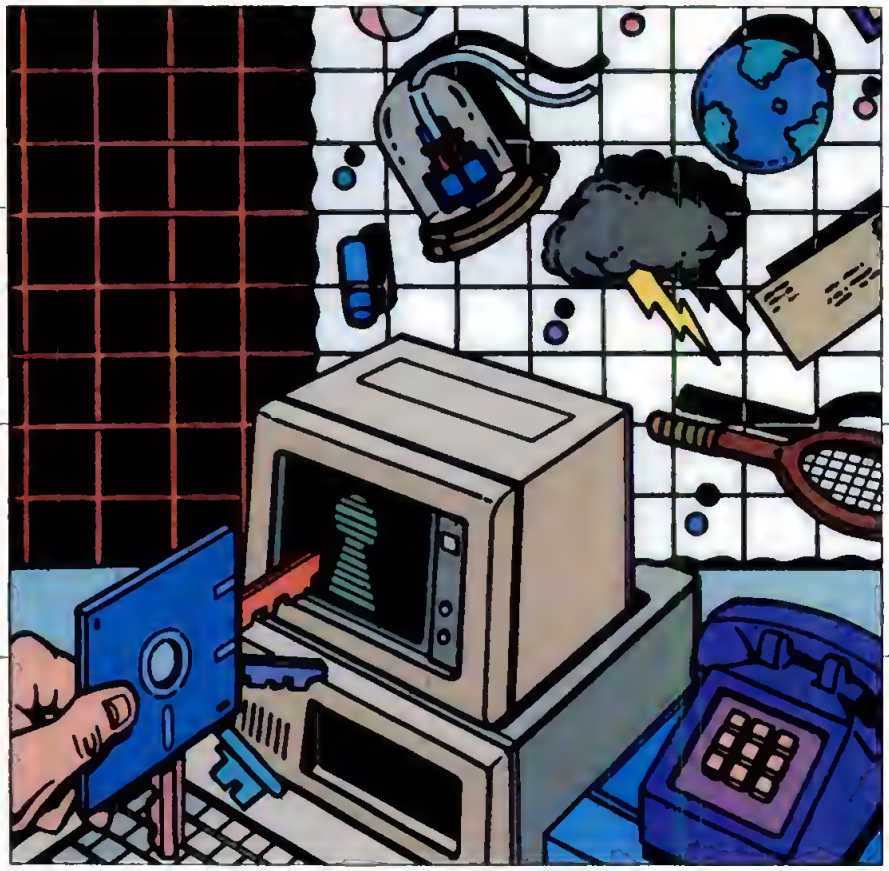
According to the manual, *ACCESS* performs four tasks: It sets up the computer and modem to be compatible with the network, dials the service, signs on, and allows you to use your computer as a terminal. It also lets you save information coming in from the service and print that information at any time.

The package comes with a fairly clear manual and a disk containing the *ACCESS* main program, a setup program that allows you to customize *ACCESS* for a printer or for certain compatible machines (for example, if you are using a Compaq, which has a monochrome screen with a color graphics card, you have to adjust the program), and a sample letter to test the software.

ACCESS is totally menu driven. The Main menu, which you call up by typing Access, gives you an immediate choice among five popular services (CompuServe, Dow Jones, EasyLink, MCI Mail, and The Source), three free slots for other services, a category labeled Choose Modem, and Exit. (See Figure 1.) The screens, deep blue with gray and yellow lettering, are quite distinguished and easy to read. Highlights are a fuzzy white, and error messages appear in bright red.

Choose Your Modem

According to the manual, after copying the software the first-time user must begin by selecting Choose Modem. This category then presents a list with 14 choices: 12



commercial modems, Acoustic, and Other. (See Figure 2.) You must specify whether your modem connects to COM1: or COM2: and whether your phone is rotary or touch tone. *ACCESS* is then ready to be used.

On my first try, I decided to send myself an electronic letter on MCI Mail. I chose the appropriate number from the main menu and was presented with a new menu divided into two parts: Service Information and Communications Settings. Since I had entered a pre-existing category, much of the information about MCI Mail was already entered, including the name of the service and all communications settings: modem speed, data bits, stop bits, parity, and half or full duplex. There was a blank space left for the telephone number and another asking if I wanted to create an automatic sign-on.

You travel down through the categories by using the Tab key and up by using the shift and Tab key together (I found that the up and down arrows also work, although they do not go directly from category to category). The defaults are easy to change by typing over the existing data; new settings are automatically saved.

ACCESS is driven by the computer's function keys. Once you have entered the phone number, you can immediately hit the F10 key to begin dialing the system. F10 is also used as a safety device when you ask for a change in the program; for example, when you exit a service, a message will appear on the screen asking you to hit F10 if you want to exit or Esc if you change your mind.

ACCESS's automatic sign-on function is the key to simplifying the process of entering a network. Once the program has recorded the automatic sign-on function properly, you can thereafter call up *ACCESS*, choose the network, and then sit back while all the work is done for you. In order to set the processs in motion, I put a Y next to the question "Create Automatic Sign-on?" and hit the F10 key.

A message appeared in the center of the screen, telling me that the machine was dialing the number. (If I had previously registered an automatic sign-on, the program would have first asked if I really wanted to change the procedure.) With the connection made, the program immediately shifted to the terminal screen.

Most of the space on the screen is reserved for communications with the service, except for the very top line, which names the service currently in use, and the very bottom, which is reserved for the *ACCESS* menu and messages. The menu tells you which function keys to use for help, print, disconnect, send, and save.

If you are creating an automatic sign-

Illustration: Brad Hamann

on, a highlighted message will also appear, telling you to hit F4 to stop the sign-on process. As long as that message is on, *ACCESS* is recording every service prompt and user response.

For Repeat Users

The automatic sign-on is especially useful if you use a particular feature of your service frequently. For example, I decided to enter one of the open Other Service slots on the Main menu to create a sign-on that would take me directly to the

The automatic sign-on is especially useful if you use a particular feature of your service frequently.

Source's news report. After entering the Other Service screen, I named it The Source-USNEWS, set the parameters, typed in the phone number, and told *ACCESS* to set the automatic sign-on (see Figure 3). I kept the sign-on going until I reached the USNEWS feature, signed off, went to the *ACCESS* main menu (which now contained the name of my new field), and then tried again. *ACCESS* ran through its paces perfectly, and I didn't have to twitch a finger to find myself right in The Source's news. (see Figure 3.)

Of course, this system is not perfect. If anything at all goes wrong while you're recording the automatic sign-on, the program will cheerfully record the mistake as well. You're likely to discover your mistake later, possibly when you'll find it most inconvenient. For example, the first time I entered MCI Mail, I hit the Return key twice. That didn't bother MCI Mail, but when I later tried to get *ACCESS* to sign on for me, it gave a control code as my MCI Mail ID.

In addition, you have to remember to halt the process (by pressing the appropriate function key) when your sign-on is complete. I omitted that crucial step the first time I signed onto the Source, and the next time I tried to get into the Source, *ACCESS* dialed the number, made the connection, signed on, and then signed off for me—I wondered whether the computer was bored and had decided to take things into its own hands.

Once you are inside a network, you essentially follow its rules, although *ACCESS* does allow you to use its own scroll up and scroll down facilities. You



Figure 1: *The* PFS:ACCESS *Main menu; with one of the Other Service slots used.*

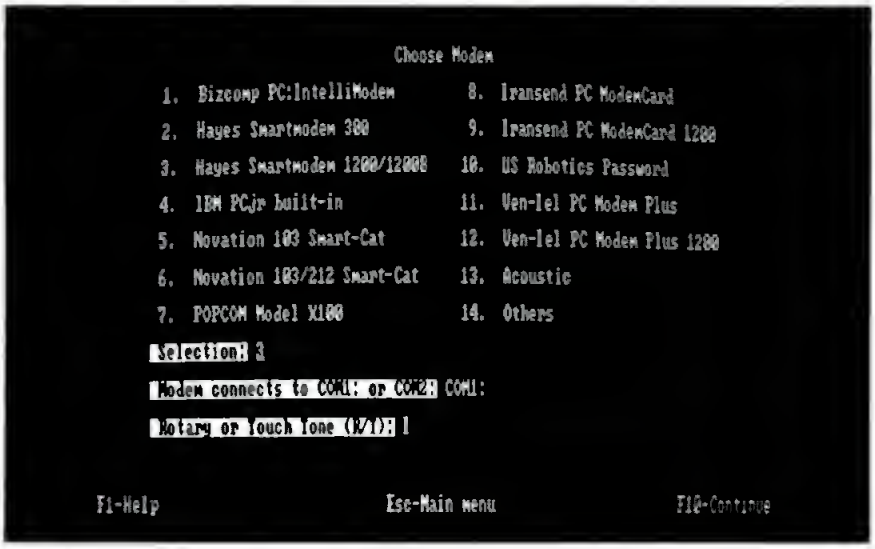


Figure 2: *The* ACCESS *Choose Modem menu.*

FACT FILE

PFS:ACCESS
Software Publishing Corporation
1901 Landings Dr.
Mountain View, CA 94043
(415) 962-8910
List Price: $95
Requires: 128K RAM, one disk drive, modem, PC-DOS.

CIRCLE 696 ON READER SERVICE CARD



Figure 3: *The screen setup for The Source-USNEWS.*

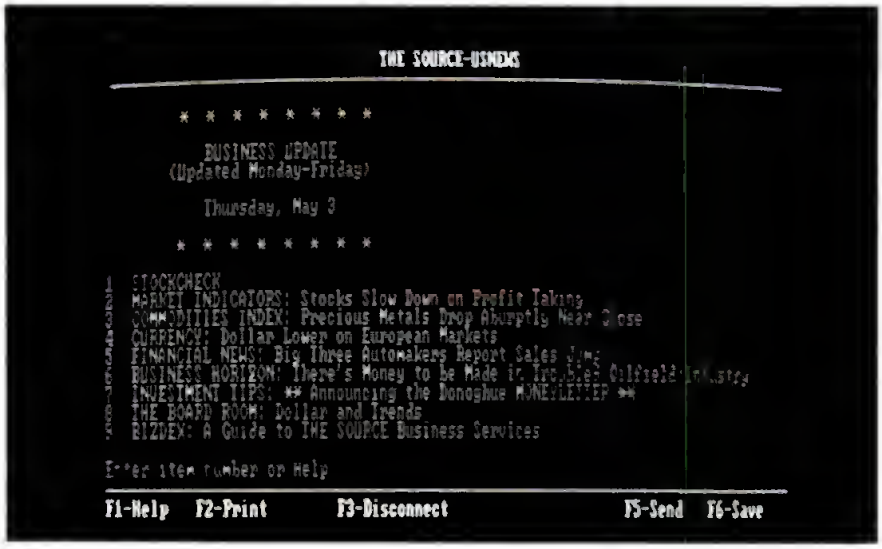


Figure 4: *One keystroke takes you from the screen above into The Source-USNEWS.*

can also print everything you are receiving by simply hitting the F2 key (a highlighted message will remind you to hit F2 again to stop printing).

ACCESS handily allows you to send a presaved file. If you hit the F5 key, a small box appears at the bottom of your screen asking for the file name and a privacy code. If you simply want to send the file, you type the name and hit the return and the program will begin sending. If you want the message garbled, press the Tab key and then choose a security code.

The code, any eight characters you choose, ensures a reasonable amount of security for your document. Once you enter the code, any text you send will be garbled by the program automatically, using (according to the manual) a coding process based upon the Data Encryption Standard of the National Bureau of Standards.

You can read the message back only by saving the file, using the *ACCESS* Save function, and entering the security code when asked. The program will then save the message as it was entered. You can also save any part of your transaction by the same process.

The Software Publishing Company's two word processing packages, *PFS:REPORT* and *PFS:WRITE*, are both said to be compatible with *ACCESS*. Other word processors are compatible as well; when I sent myself an electronic letter through MCI Mail using a *WordStar* file, the program accepted it and reinterpreted the coded message with no problem.

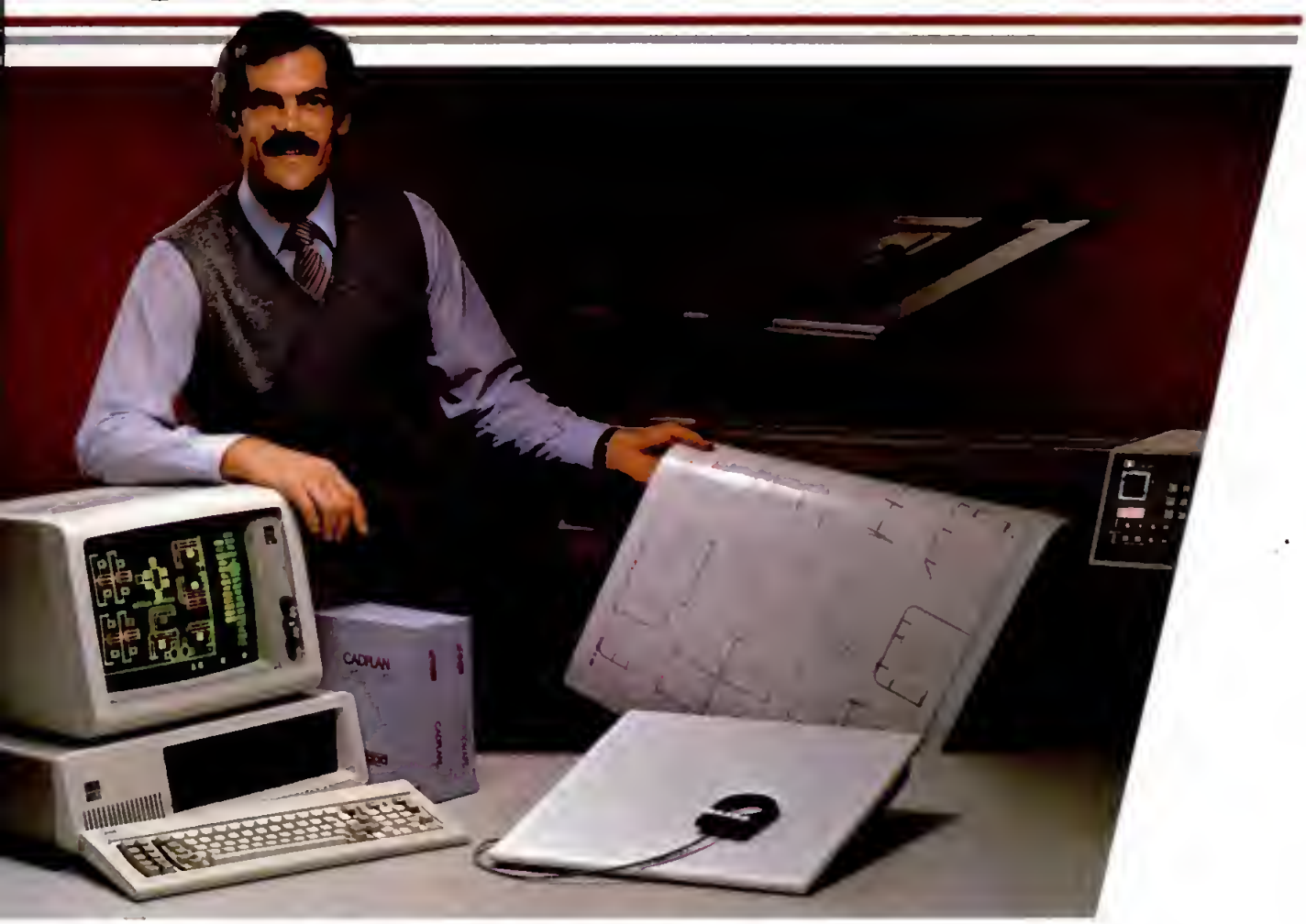
Connection Confusion

ACCESS usually had no trouble dialing and making connections but if I broke a connection and then tried to redial immediately afterwards, the program sometimes experienced difficulty. At one point, after I had tried without success to dial MCI MAIL three times, the program rebelled and asked me to insert the *ACCESS* disk in drive A:. Since the disk was already in drive A:, I was puzzled, but after trying to remedy the situation first by hitting F10 again and then by reinserting the disk, I gave up, exited the program, and re-entered.

As I exited, I discovered a second problem. There are no instructions for putting DOS on the *ACCESS* program disk, so when I hit E for exit at the Main menu, the computer obediently exited into a ROM request for COMMAND.COM. Since I had the *ACCESS* disk in drive A: and my data disk in drive B:, I had to find my DOS disk, reboot, and then re-enter the program—which was inconvenient.

ACCESS is a very handy little program if you are a frequent user of microcomputer networks or information systems. It has definite limitations; it assumes that you will only use up to eight services, and it is only useful for signing on to communications networks—it is not set up for computer-to-computer conversations. The harassed businessperson will find *ACCESS* useful, but people who want to use their modems for more than simply accessing networks should be able to find more flexible communications programs. ■

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Tailoring DOS To Fit

DOS permits you to adapt the system to meet your needs. You can set up custom file systems and create batch commands for file access, backup, and record management.



This article is excerpted from Chapters 15 and 16 of Running MS-DOS *by Van Wolverton, to be published by the Microsoft Press division of Microsoft Corporation. The book is a tutorial on the MS-DOS operating system, which Microsoft developed. Chapter 16, which forms the major portion of this material, describes ways of tailoring DOS to fit your needs.*

The author, Van Wolverton, has been a professional writer for 20 years and a technical writer for the last 10. His work at Intel and IBM before joining Microsoft has given him special insight into DOS and the workings of IBM PC.

You will note that the typographic conventions for DOS commands in the figures and program listings are different from those PC *usually uses. To avoid confusion, we have followed the conventions Microsoft used.*

Although it may sometimes seem that DOS offers more options than you need, those options give you flexibility in tailoring DOS. This article shows you several ways to tailor DOS to your needs or preferences. Not only does this tailoring make DOS fit your work needs better, some of the techniques described here can make your system immediately useful without commercial application programs. And tailoring can also make it easier to achieve consistency in such procedures as backing up a fixed disk, if several people will be using the computer.

This article describes the following items:

- Different ways to set up a filing system that matches the way the computer is used.
- Batch commands that simplify use of a multilevel filing system.
- Batch commands that automate backing up a fixed disk.
- Several simple record-management schemes similar to that used in sorting the telephone index in Figure 1.
- A few of the less frequently used DOS commands.

Setting up a Filing System

It doesn't take long to set up a file system under DOS—all you need are a few Make Directory (MKDIR) commands—but it can be time-consuming to change a file structure after dozens or hundreds of files have been created. A few minutes' thought about who will use the computer, and what they'll use it for, can result in a file structure that suits the way the computer is used.

In the following examples, the root directory is assumed to contain the DOS command files, general-purpose batch files, and any other files that are needed by anyone using the system regardless of the current directory. They are especially appropriate if your computer has a fixed disk on which you store all your programs and current data files.

An Application-Based File System. If a computer is used for several applications—as it would be by an independent professional or a small business—a natural way to organize the file structure is by application program. Figure 2 shows how a file system might be set up by an independent professional who uses the machine with word processing, spreadsheet, and database management programs.

The first level of directories (WP, SPREAD, and DATABASE) contains the applications programs. The next level (BUSINESS, CLIENTS, PERSONAL) holds the data files for the applications.

With this file structure, when someone does some word processing, for example, the current directory is that which contains the document files (such as \WP\BUSINESS or \WP\PERSONAL). The PATH command is used to set the command search path to the root directory (for DOS commands and general-purpose batch files) and to \WP (for the word processing program).

On the other hand, the file system for a computer used in a small business might make the second and subsequent directory levels correspond to the departments that use the applications, rather than to the data files for the applications. Figure 3 shows how such a file system might be set up.

A Department-Based File System. Rather than beginning with the application program, as the preceding examples do, files also can be organized to emphasize the departments that use the machine. Figure 4 shows a file system for a machine

```
 1: Jones     Michele   (747) 429-6360  cons chemist
 2: Smith     John      (747) 926-2945  vend furniture
 3: White     Alice     (747) 425-7692  cust accountant
 4: Green     Fred      (541) 926-4921  cust math teach
 5: Black     John      (747) 426-3385  cons mech eng pkg
 6: Smith     Ed        (541) 835-8747  vend caterer
 7: Jones     Alison    (747) 429-5584  cons chem engineer
 8: IBM       sales     (747) 463-2000  vend Dave Hill
 9: Jones     James     (747) 636-3541  cust architect
10: Black     Alice     (747) 426-7145  cust elec eng
```

Figure 1: *A sample telephone list of consultants.*

used by the marketing, manufacturing, and administration departments of a company. The application programs are the same as in the previous examples and are used jointly by all three departments. Because each program is in a subdirectory of its own, any department can use any application just by setting the command search path to the appropriate program.

As much as anything else, the choice of how to organize files depends on how the people who use the computer view their work. If they think primarily in terms of what they're doing ("I do word processing"), the application-based structure might be more comfortable for them. If they think in terms of who they do it for ("I'm the marketing administrative assistant"), the department-based structure might be more appropriate. Neither structure is more efficient than the other; each simply reflects a different way of looking at the file system.

A User-Based File System. If several people use the computer, a file structure that emphasizes the users might be most appropriate, especially if the people use the machine for different applications. Figure 5 shows a directory structure for a system used by three people.

Again, directories are defined for the same application programs used in the other sample file structures. If the computer is used by people with varying degrees of familiarity with DOS, and if not all users need each application, this type of file structure can make the system seem more natural, especially if you create some batch commands that simplify using the directories.

Batch Files

Batch files designed for using directories can be simple or elaborate, depending on who will use them and how much time you want to invest in creating them. Creating separate directories for the people who use the system, for departments, and for application programs simplifies the appearance of the system and makes it easier to keep track of files. Separate directories can, however, also mean that you have to change directories more often. You can automate the use of directories with batch files; this technique makes it simple for all users to work with a structured filing system, even if they are not familiar

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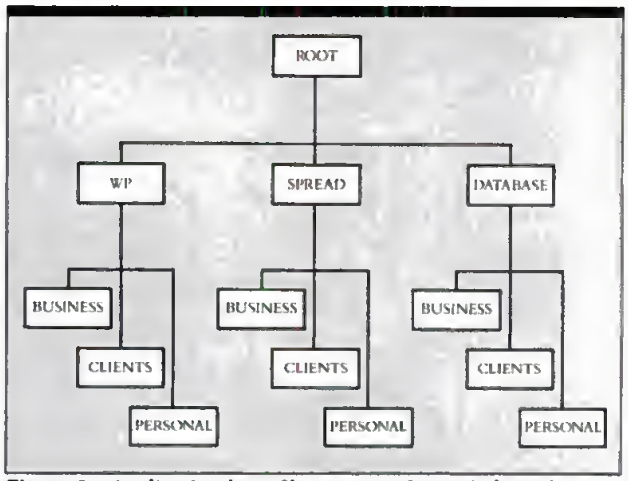


Figure 2: *Application-base file structure for an independent professional.*

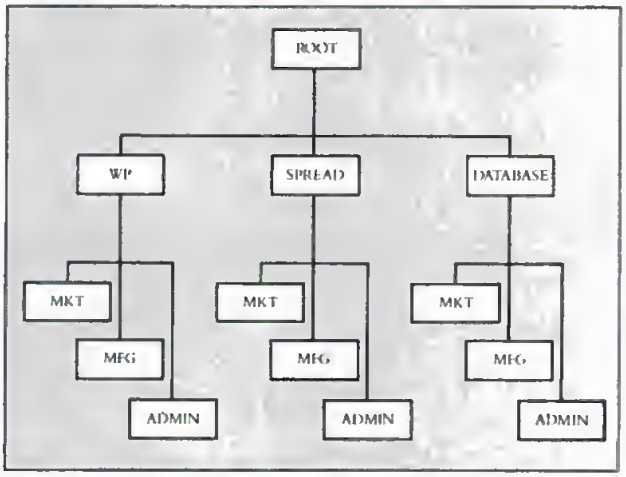


Figure 3: *Application-based file structure for a small business.*

with DOS. If you put the batch files in the root directory and make sure the command search path always includes the root, the batch files for using directories can be accessible from any directory or subdirectory. Switching from one directory and application program to another is always just a matter of typing a single command.

In its simplest form, a batch file to use a directory changes the current directory and sets the command search path. For example, suppose you have the file structure shown in Figure 4, and you want a batch file called WORDMKT.BAT in the root directory to help manage word processing for the marketing department. WORDMKT.BAT could look like the following example (line numbers here and throughout the article are for reference only):

```
1: echo off
2: cd \mkt\wp
3: path \;\programs\wp
```

The Change Directory (CHDIR) command sets the current directory to \MKT\WP, which contains the marketing department's word processing files; the PATH command sets the command path to the root directory (for DOS command files and general-purpose batch files) and to \PROGRAMS\WP (for the word processing program). To use your word processing program with the marketing data files, you would just type WORDMKT.

You could create a similar batch file for each directory that contains data files and then use any directory just by typing the name of the appropriate batch file. Figure 6 shows the directories in Figure 4 that contain data files and indicates how the corresponding batch files might be named.

To produce the other batch files, you simply alter the CHDIR and PATH commands to point to the corresponding directories that contain the data files and application programs. For example, the batch command (SPMFG.BAT) to do spreadsheets for the manufacturing department could contain:

```
1: echo off
2: cd \mfg\spread
3: path \;\programs\spread
```

With these batch files in the root directory, you could type WORDMKT and edit a few marketing department documents, type SPADM and work on some spreadsheets for the administration department, then type DBMFG and update the manufacturing department's inventory database, all without worrying about—or even knowing about—the correct directory. A set of batch files like these makes the multilevel filing system not only more flexible, but also easier to use.

To dress up the appearance of your batch files for using directories, you could clear the screen and display the directory. The CHDIR and PATH commands would be unchanged; this modified version of WORDMKT.BAT would look like the following:

```
1: echo off
2: cd \mkt\wp
3: path \;\programs\wp
4: cls
5: dir /w
```

The /W parameter of the Directory (DIR) command is used here, in case the directory contains more than one screenful of files.

Creating Your Own Menu System

If someone unfamiliar with DOS will be using the system, you can use batch files to create a menu system that quickly moves the less-experienced user to the correct directory. For example, suppose you have the file structure shown in Figure 4; the batch files described here let someone turn on the system and, by typing MKT, see a display like this:


dBASE
III
dBASE III
SYSTEM DISK
Serial No 100001
Format IBM PC XT and 100% compatibles
PC-DOS 2.0
Version: 1.0
ASHTON-TATE

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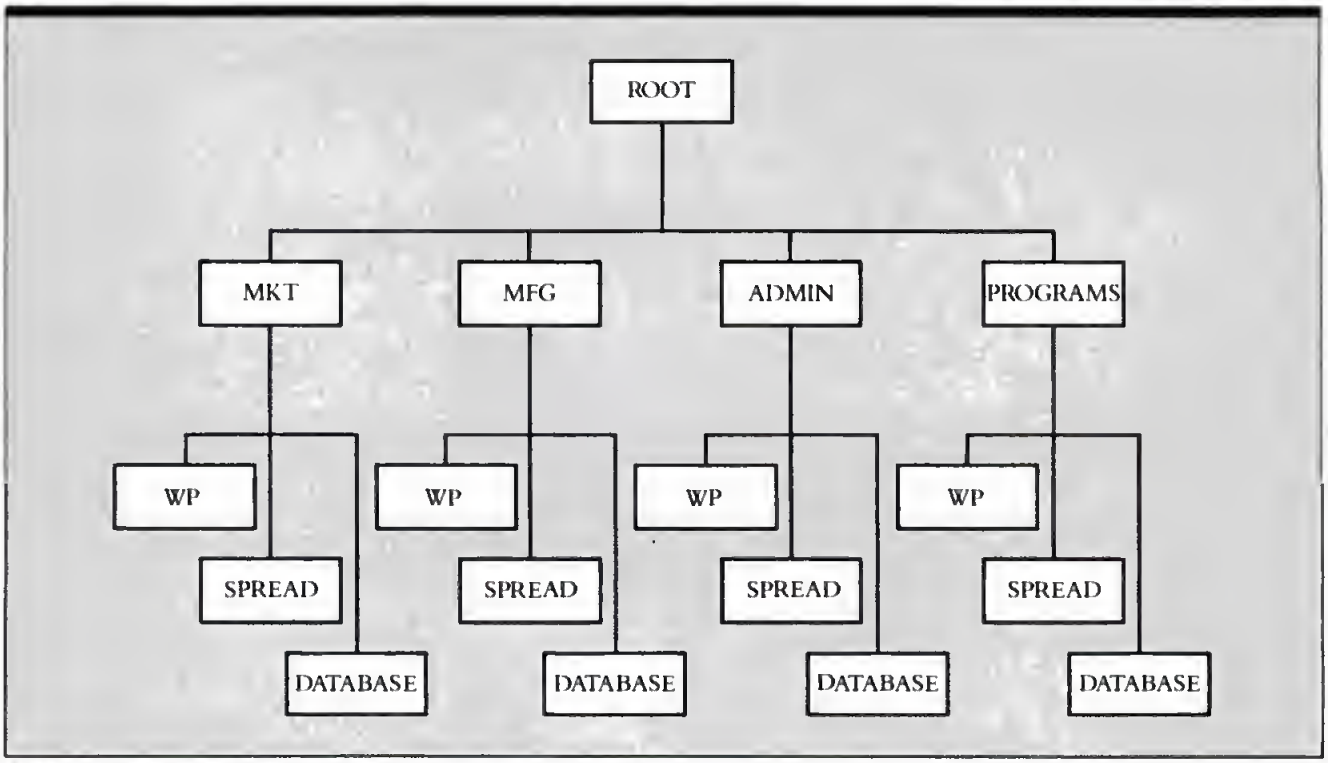


Figure 4: *Department-based file structure.*

```
                        *** MARKETING ***
Applications: Word processing
              Spreadsheet
              Data base
Enter W, S, or D
-
```

If the user types W, the following screen is displayed (the directory entries are hypothetical):

```
                *** MARKETING_WORD PRDCESSING ***
Document files:

 Volume in drive C has no label
 Directory of  C:\mkt\wp

TAXMEMD DOC     TMP031S ...BUDGET  DOC
INVEN01 DOC     SLSLTR...THP0311 DOC
CONFNOT DOC     LETR04  DOC...SLSMEMD DOC
LETR07  DOC     INVEN04 DOC...INVEN02 DOC
SVCREC  DOC     LETR06  DOC...
      23 File(s)   7162384 bytes free

C>_
```

Displays of this kind would require four batch files for each department. For the marketing department, there would be one (MKT.BAT) in the root directory and three (W.BAT, S.BAT, and D.BAT) in \MKT. First, here are the contents of MKT.BAT:

```
1: echo off
2: cd \mkt
3: cls
4: REM THREE TABS AT BEGINNING OF FOLLOWING ECHO
   COMMAND
5: echo <Tab><Tab><Tab>*** MARKETING ***
6: echo
7: echo Applications: Word processing
8: echo                Spreadsheet
9: echo                Data base
10: echo
11: echo Enter W, S, or D
12: prompt $a
```

As you can see, most of the commands are ECHO commands. The batch file is straightforward. It turns off Echo, changes the directory to \MKT, clears the screen, and displays the menu and choices. Then the PROMPT command (described later in this article) makes the system prompt (C>) invisible, so the user sees only the cursor, and the system returns to command level. At this point, MKT.BAT sends you out—even though, as the sample screen display showed, this batch file appears to be waiting for a reply to the prompt Enter W, S, or D.

If the user types W (for word processing), DOS carries out the batch file W.BAT in \MKT. Its contents are

```
1: echo. off
2: cls
3: cd wp
4: path \;\programs\wp
5: REM TWO TABS IN FOLLOWING ECHO COMMAND
6: echo <Tab><Tab>*** MARKETING_WORD PRDCESSING ***
7: echo Document files:
8: prompt
9: dir *.doc /w
```

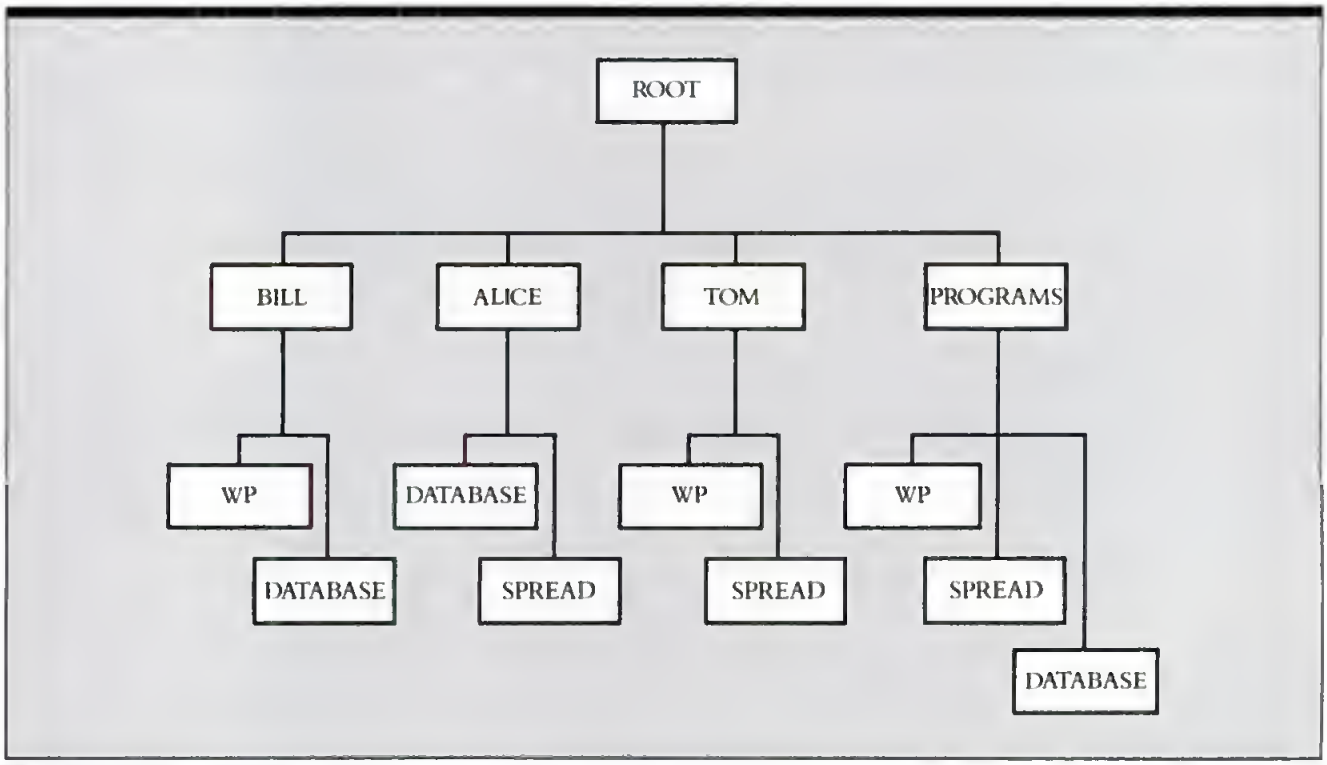


Figure 5: *User-based file structure.*

This batch file produces the sample screen display listing the marketing department word processing files. It, too, is straightforward. It turns the echo off, clears the screen, changes the directory to \MKT\WP, sets the command search path to the root and \PROGRAMS\ WP, displays the titles, resets the system prompt to its normal form, and displays in the wide format the directory entries of all those files with an extension of DOC.

To complete the menu system in \MKT, you need two more batch files similar to W.BAT, one for your spreadsheet and one for your database program. The contents of S.BAT for the spreadsheet are

```
1: echo off
2: cls
3: cd spreed
4: path \;\programs\spread
5: REM TWO TABS IN FOLLOWING ECHO COMMAND
6: echo <Tab><Tab>*** MARKETING_SPREADSHEET ***
7: echo Spreadsheet files:
8: prompt
9: dir *.pln /w
```

In the preceding and following lists, the changes from W.BAT are shaded. You can see that the format is the same. In this example, spreadsheet files are given the extension PLN. To complete the menu system, here are the contents of D.BAT:

```
1: echo off
2: cls
3: cd database
4: path \;\programs\database
5: REM TWO TABS IN FOLLOWING ECHO COMMAND
6: echo <Tab><Tab>*** MARKETING_DATA BASE ***
7: echo Detebese files:
8: prompt
9: dir.* dat /w
```

By clearing the screen, displaying your own titles, displaying directory entries, and otherwise controlling the appearance of the system, you can use batch files like these to make the system appear custom-tailored for your own company or department, or even for an individual user. One person who understands how to use the flexibility and power of DOS can make the system easier to use and more productive for everyone else. Batch commands are the key.

Automating Fixed Disk Backup

DOS provides a way to reduce the amount of time required to back up files. (Remember that the BACKUP command applies to Version 2.1 of MS-DOS and to all Version 2 releases of DOS for the IBM personal computers.)

Suppose you have the file structure shown in Figure 4. You decide that each month you should back up all marketing and manufacturing files (all files in \MKT and MFG and their subdirectories) and that each week you should back up all marketing word processing documents (files with an extension of DOC) and manufacturing spreadsheets (files with an exten-

sion of PLN) that have changed since the previous week. You can create two batch files—MNTHBKUP.BAT and WEEKBKUP.BAT—that contain the required BACKUP commands.

```
1: echo off
2: cls
3: echo *** MONTHLY FILE BACKUP ***
4: echo
5: echo Put a formatted diskette in drive A
6: pause
7: backup \mkt a: /s
8: backup \mfg a: /s /a
9: echo LABEL DISKETTE^BACKUP FOR <month>
```

The batch file starts by clearing the screen, displaying a title, and instructing the user to put the backup diskette in the A: drive. The first BACKUP command backs up all files from \MKT and all its subdirectories. Any previously existing files on the backup disk are erased. The second BACKUP command backs up all files from \MFG and all its subdirectories, adding them to the files backed up from \MKT.

```
1: echo off
2: cls
3: echo *** WEEKLY DOCUMENT BACKUP ***
4: echo
5: echo Put a formatted diskette in drive A
6: pause
7: backup \mkt\wp\* doc a: /m
8: backup \mfg\spread\* pln a: /m /a
9: echo LABEL DISKETTE^BACKUP FOR WEEK BEGINNING <date>
```

Like MNTHBKUP.BAT, WEEKBKUP.BAT starts by clearing the screen, displaying a title, and making sure the correct diskette goes in the A: drive. The first BACKUP command backs up all files with the extension DOC from \MKT\WP that have been modified since the last backup. Any previously existing files on the backup disk are erased. The second BACKUP command backs up all files with the extension PLN from \MFG\SPREAD.

Unless your system is heavily used, only one backup disk per week is required to back up the changed files of both departments. Because the monthly backup copies all files, you can reuse the weekly backup disks in the following month.

With batch files like these, users can back up files without knowing how to use the BACKUP command. All they have to do is type WEEKBKUP once a week and MNTHBKUP once a month and follow the instructions. If you put both batch files in the root directory and set the command search path to the root directory with the PATH command, you or anyone else can use these batch files no matter what the current directory is.

Renaming the FORMAT Command

If you're using a fixed disk, you should note that it's possible to erase all files on the fixed disk by inadvertently formatting it. The scenario goes like this: The fixed disk (drive C:) is the current drive; you want to format a floppy disk, so you put it in drive A: and type FORMAT but forget to add A: to the command. You have told DOS to format the disk in the current drive (the fixed disk). DOS displays its message warning you that formatting the disk erases all files. Believing that the disk to be formatted is the diskette in the A: drive, you press the Enter key. DOS dutifully formats the fixed disk, removing everything that was stored on it.

Directory that Contains Data Files	Directory that Contains Program	Name of Batch File
\MKT\WP	\PROGRAMS\WP	WORDMKT.BAT
\MKT\SPREAD	\PROGRAMS\SPREAD	SPMKT.BAT
\MKT\DATABASE	\PROGRAMS\DATABASE	DBMKT.BAT
\MFG\WP	\PROGRAMS\WP	WORDMFG.BAT
\MFG\SPREAD	\PROGRAMS\SPREAD	SPMFG.BAT
\MFG\DATABASE	\PROGRAMS\DATABASE	DBMKT.BAT
\ADMIN\WP	\PROGRAMS\WP	WORDADM.BAT
\ADMIN\SPREAD	\PROGRAMS\SPREAD	SPADM.BAT
\ADMIN\DATABASE	\PROGRAMS\DATABASE	DBADM.BAT

Figure 6: *Directories and batch files for a department-based file structure.*

Although it's not likely you would make both these errors (forget to type A: and tell DOS to go ahead without checking), the consequences are severe enough that you should consider protecting yourself against the possibility. The technique is fairly simple: rename the FORMAT command file and create a batch file named FORMAT that always formats the disk in the A: drive. The following commands do it (assuming the current directory is the root directory on the fixed disk).

```
C>rename format.com xformat.com
C>copy con format.bat
xformat a: %1 %2 %3
^Z
        1 File(s) copied
```

To format a disk in drive A: with this batch file, you just type FORMAT; there's no chance of formatting the disk in the current drive. To use any parameters of the FORMAT command other than the drive letter, include them with your new FORMAT command. To format a single-sided system disk in the A: drive, for example, you would type FORMAT /S/1.

If you should want to format a disk in a drive other than A:, just enter the FORMAT command with the usual parameters, but remember to type the command as XFORMAT, because you renamed the command file.

Using DOS for Record Management

Although they cannot replace a record- or file-management program, DOS filter commands and batch files can be used to keep track of small- to medium-size files—say, from 50 to 200 entries. This technique is simple and quick, and the price is right: you don't need anything except DOS.

You need this kind of file tracking because as you use the computer, your collection of computer files will grow and grow. If you use a word processor, for example, keeping track

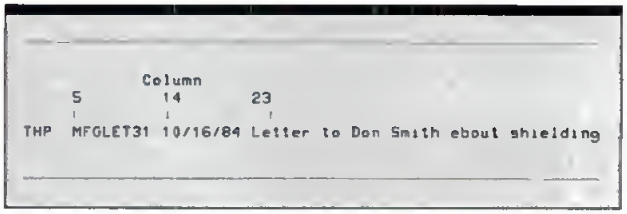


Figure 7: *Word processing index file.*

of all the letters and other documents you create can be a problem. Although using wildcard characters with the DIR command makes a particular file easier to find, you still may have to do some searching to answer such questions as, "How many letters did I write in October to the regional sales office?" or "When did we respond to that request from the National Science Foundation?"

You can solve this problem by creating an index file that describes all your word processing files. You could use the same technique to keep track of any large collection of files.

Figure 7 shows the items of information, and the columns in which they begin, to give you the format for an index file that keeps track of word processing files.

Columns 1 through 3 of Figure 7 contain the initials of the originator of the document (THP). Columns 5 through 12 contain the filename (MFGLET31). All files are assumed to have the same extension. Columns 14 through 21 contain the date the document was created (10/16/84). Columns 23 through 79 contain your description of the document.

Index File Searches

If you keep this index file up to date as you create word processing files, you can quickly find files and answer questions with batch files. You can, for instance, put the DOS FIND and SORT commands in batch files to create your own search commands and achieve some of the capabilities of a simple record-management program.

For example, the simplest search uses the FIND command to display all records that contain a particular string. Create a batch file named SHOW.BAT by typing the following:

```
B>copy con show.bat
echo off
find "%1" ph
^Z
        1 File(s) copied
```

This batch file gives you a SHOW command that displays all records from PH, the phone list of consultants shown in Figure 1, that contain a string you specify as the parameter to your SHOW command. To search the phone list, type SHOW followed by the string. For example, to display all consultants (entries that contain the string "CONS"), type

```
B>showcons
```

DOS displays all entries for consultants.

```
B>echo off

---------- ph
Jones      Michele    (747) 429-6360  cons chemist
Black      John       (747) 426-3385  cons mech eng ptg
Jones      Alison     (747) 429-5584  cons chem engineer
```

This procedure is easier than typing FIND "CONS" PH.

You also can combine FIND commands to search for records that contain various combinations of character strings, such as all consultants named Jones or all entries outside the 747 area code. Putting the FIND commands in a batch file saves even more typing than the SHOW command you just created.

For example, suppose you want to create a command to show all entries that contain both one string and another string. This requires two FIND commands, with the output of the first piped to the second. You could call such a command SHOWAND. Create a file named SHOWAND.BAT by typing the following:

```
B>copy con showand.bat
echo off
find "%1" ph | find "%2"
^Z
        1 File(s) copied
```

This batch command takes two parameters: the two strings the FIND command searches for. Now you can search the phone list for entries that contain two strings just as easily as you can search for entries that contain one string. Just type SHOWAND followed by the two strings. For example, to display all consultants named Jones, type

```
B>showandcons Jones
```

DOS displays the records that contain both strings:

```
B>echo off

Jones      Michele    (747) 429-6360  cons chemist
Jones      Alison     (747) 429-5584  cons chem engineer
```

You can use this technique to answer your earlier questions. For example, to answer the question, "When did we respond to that request from the National Science Foundation?" you would type SHOW NSF. To answer the question, "What letters did I write to the regional sales office in October?" you would type SHOWAND SALES 10/.

Do you want a list of all the documents about the new inventory system, or a list of all letters sent in March? If you keep your index up-to-date, the answers are just a command away.

Simple Bibliographic Index

If your work requires a lot of reading, you're probably frustrated at times by how easy it is to forget where you saw

```
                        Column
          10        19  23              38
          |         |   |               |
WSJournl  10/16/84  18  Smith Don       Copper found in Montana
```

Figure 8: *Bibliographic index file.*

```
                        Column
          10        19          30          43
          |         |           |           |
10/16/84  499 95    Ailanthus   H78449002-1   VHS video recorder
```

Figure 9: *Capital inventory index file.*

something. If research is important to your job, but it is not significant enough to justify purchasing and learning to use a database or bibliographic retrieval program, this simple technique might be the answer.

Again, the answer is to create an index file and search it with batch commands. Figure 8 shows the items of information, and the columns in which they begin, to give you the format for an index file that keeps track of magazine articles, books, and other sources of reference material.

Columns 1 through 8 of Figure 8 contain the abbreviated title of the journal, book, or other source. Columns 10 through 17 contain the date of the reference. Columns 19 through 21 contain the page number. Columns 23 through 36 contain the author's name. Columns 38 through 79 contain the title or description of the reference. To answer the question, "Where did I see that article on kinesthesia?" you would type SHOW KINE. To answer the question, "What about that article I saw last June about laser surgery?" you would type SHOWAND 6/ LASER. The time it takes to keep this index up-to-date pays off because you can find valuable information much more quickly.

Capital Inventory

If you're an independent professional or you operate a small business, you could easily have a much larger investment in capital goods than you realize. Your accountant and insurance agent probably emphasize the importance of keeping an up-to-date inventory of capital goods, but it's easy to put off this sort of record keeping.

Figure 9 shows a simple index file that lets you keep track of your capital goods. It's no substitute for a complete inventory system, but it's a start that lets you quickly search and sort your inventory.

Columns 1 through 8 of Figure 9 contain the date of the acquisition. Columns 10 through 17 contain the cost of acquisition. Columns 19 through 28 contain the manufacturer's name. Columns 30 through 41 contain the serial number. Columns 43 through 79 contain the description.

Here, too, you can use batch files to keep track of your inventory with one command. To answer the question, "When did we get the copy machine?" type SHOW COPY. To answer the question, "What did we buy before 1984?" type SHOW ECPT /84.

This technique also can be used to keep track of your personal inventory for insurance purposes; with a bit of modification, it could be used for collections, such as coins, stamps, or first editions.

Occasionally Used Commands

The DOS commands VER, PROMPT, and ASSIGN can be useful in tailoring your system, but you seldom need them.

VER. The Version (VER) command displays the number of the version of DOS you're using. If you use more than one version, or are using someone else's machine, this gives you a quick way to check the version. The VER command has no parameters:

```
ver
```

If you're using Version 2.1 of DOS with an IBM Personal Computer, for example, DOS replies IBM Personal Computer

DOS Version 2.10 in response to the command.

PROMPT. You can change the system prompt with the PROMPT command to display more than the current drive letter. The change takes effect after you enter the command.

The PROMPT command has one parameter:

```
prompt <string>
```

The <string> part of the command is a string of character that defines the new system prompt. You can use any characters you wish. You also can cause the new prompt to include one or more items of useful information by including a dollar sign followed by one of the following characters to specify what you want the prompt to contain:

Character	Produces
D	The current date
P	The current directory
N	The current drive
T	The current time
V	The DOS version number
G	A greater-than sign (>)
L	A less-than sign (<)
B	A vertical bar (¦)
Q	An equal sign (=)
E	An Escape character
H	A backspace
$	A dollar sign ($)
_	A signal to end the current line and start a new one (the character is an underscore, not a hyphen)

You can use any combination of $ followed by a character that you wish. DOS ignores any combination of $ followed by a character not in the preceding list. You saw an example of this earlier in this article: In the batch file MKT.BAT, the system prompt was set to nothing (make invisible) with the command PROMPT $A.

If you enter the PROMPT command with no parameter (just type PROMPT), DOS restores the prompt to its usual form: the letter of the current drive followed by a greater-than sign (for example, A>).

The PROMPT command takes effect immediately, so it's easy to experiment. Don't be afraid to do so, because all you need do to restore the system prompt to its standard form is type PROMPT.

In the examples that follow, notice how the system prompt changes each time to show the effect of the previous PROMPT command. To leave a blank space between the end of the system prompt and the beginning of the command that you type next, press the space bar before pressing the Enter key to end each command.

To define the system prompt as the current directory (including the current drive), type

```
A>prompt $p

B:\mkt\wp _
```

The example assumes that the current drive is B: and that the directory is \MKT\WP. To define the system prompt as two lines that show the date and time, type

```
B:\mkt\wp prompt $d$_$t

Tue  10-16-84
14:57:03.63 _
```

The time and date will vary depending on how you have set the time and date in your system. Press the Enter key several times; you can see that DOS keeps the time current.

Each user can easily tailor the system prompt to the preferred balance of brevity and information by putting a PROMPT command in a batch file.

ASSIGN. Some application programs require that you put the disks with your data files in one particular drive. This requirement can be inconvenient if you're using a fixed disk. The ASSIGN command gives you a solution: it lets you tell DOS to make a drive letter refer to a different drive (for example, to tell DOS to use the fixed disk, the C: drive, whenever DOS receives a request for drive B:).

Because the ASSIGN command affects all requests for a drive, you should use it with some caution—especially if you are using a fixed disk. Always bear in mind that some DOS commands, such as ERASE, delete existing files from the floppy disk in the specified drive. If you use one of these commands after you have used ASSIGN, you could inadvertently lose valuable programs or data files.

The ASSIGN command has two parameters:

```
assign <drive1>=<drive2>
```

The <drive1> parameter is the letter to be assigned to a different drive. The <drive2> parameter is the letter of the drive to be used in place of <drive1>. If you omit both <drive1> and <drive2>, DOS cancels any assignments in effect.

Suppose you have a graphics program that requires all data files to be on the B: drive, but you want to use your fixed disk (drive C:) for data files. To tell DOS to assign all program requests for drive B: to drive C: type ASSIGN B=C.

The assignment affects all requests for the drive, including any commands you enter. If you assign drive B: to drive C: as in the previous example, and then type DIR B:, DOS displays the directory of the fixed disk. The assignment remains in effect until you restart DOS or cancel the assignment by typing ASSIGN. ■

Excerpted from Running MS-DOS *by Van Wolverton, © 1984, by permission of Microsoft Press, all rights reserved.*

APPLICATIONS

A Casino Puts Its Chips on the PC

1 2 3 4

Resorts International Casino Hotel in Atlantic City is managing its gaming operations with a combination of minicomputers and PCs scattered among the gamblers.

MARTIN PORTER





An operator using a PC on the Resorts International casino floor.

With its mirrored and red-upholstered walls, green-felt tables, and bow-tied dealers and staff, the Resorts International Casino in Atlantic City looks more like a 19th century Western gambling den than a modern link in the chain of gaming establishments and hotels owned by this multinational conglomerate.

But beneath the classic veneer lies enough electronics equipment to put the surveillance capabilities of the FBI to shame. More than 60 IBM PCs comprise part of a complex monitoring and management system. A pair of minicomputers registers every pull of a slot machine's arm and compiles a running total of the millions of dollars won by patrons. Like a Times Square sign, these figures are then emblazoned in lights across one casino wall. Videocameras overhead monitor every move the dealers make.

The PCs are scattered around the casino floor within an arm's reach of every blackjack table, roulette wheel, or crap game. Others are in the casino bank, known as the "cage." The machines have been effectively camouflaged to match the casino's gaudy interior: They are housed in burgundy-lacquered cabinets that shield their Princeton Graphics color monitors from common view and keep their CPUs accessible only to authorized personnel in possession of security clearance and two pass keys.

Computers are no strangers to casinos. The gambling business has always depended on knowing "the numbers"; it has used computers to calculate odds for years. Resorts International is, in fact, the last of the nine casinos in Atlantic City to go on-line at the tables.

> Resorts International wanted pit-side computers that could issue credit markers or complimentary service chits to customers and validate signatures on the scene.

PC Linkup

What is unusual about Resort's configuration is that it uses PCs both as terminals, to monitor the games for the casino's management and the Casino Control Commission (CCC), and as computers, to issue customer credit and distribute chits for complimentary services that range from free drinks, meals, and show tickets to all-expenses-paid junkets. In the process, the PCs are assembling a comprehensive database of "serious" gamblers, and allowing Resorts International to accurately gauge its win and loss records for every table, game, and dealer.

Although most other casinos use minicomputers supporting dumb terminals on the gambling floor, Resorts International data processing director Bill Wacker and a company review committee decided they needed more. They wanted pit-side computers that could issue credit markers or complimentary service chits to customers, validate signatures on the scene, as well as make use of a pair of DEC PDP-11 minicomputers the hotel already owned. The PDP-11s were installed in 1981 to monitor the casino's slot machines. They not only helped the casino maintain the machines mechanically, but developed a picture of slot machine traffic and profitability for the casino management. The minicomputers are hooked up to an inconspicuous microprocessor attached to the side of every slot machine in the house. The system was designed by Bally Systems, the manufacturing arm of the Nevada-based

Bally conglomerate, which is not only the world's biggest maker of slot and pinball machines but also owns casinos around the world.

"Since we already had the Bally system for our slot machines we approached the company to see if we could use the PDP-11s for casino management as well," says Wacker, who worked for IBM's special Atlantic City casino unit before joining Resorts International. "I had an IBM PC at home and was impressed with its flexibility. I started kicking around the idea of using the PC as a super-intelligent terminal. Why not build a board that would let the PC drive a validating printer, a badge reader, produce signature graphics, and tie into the existing system?"

Bally built the needed board and with the help of Wacker and his staff, wrote a software program called the *Casino Management System (CMS)*, using Microsoft BASIC and several assembly routines. Wacker configured each of his PCs with 192K RAM, a Quadram memory board, and a color monitor. They were installed last June and, except for a power outage in early April, have been working 24 hours a day ever since without downtime. "We're probably running those machines harder than anyone other than IBM," Wacker maintains. The PC system is currently used only at Resorts International, but it will likely be re-implemented sometime in 1986 when the company opens a second, 100,000-square-foot, 2,700-slot-machine casino down the boardwalk.

Operation

Wacker has trained the entire casino staff to operate the machines—including the pit bosses who oversee the dealers, pit clerks who input player information, and security and credit officers. Anyone who needs to enter the system is issued a badge resembling a plastic key that is inserted into a Bally badge reader attached to the PC for entry authorization. The system allows varying degrees of authorization to be extended to each badge holder for different system functions.

A Victor validating printer spews out complimentary service chits and credit slips that look like cash register receipts from a supermarket. Credit is a big part of any casino operation—casinos don't want to limit players to gambling only the cash they have on hand. The PC coordinates a credit check as comprehensive as that for a bank loan and permits a credit line to be issued by the casino within 24 hours. Every credit player receives a CMS number and space in the data processing system. In fact, some regulars give their system codes instead of their names when cashing in a credit line.

If the casino extends credit, the information is kept on permanent file. The customer is asked for a signature, which is shipped to the cage and "read" by a special digitizing signature scanner driven by its own PC. The signature appears on the PC screen with every credit readout. The signature scanner is so advanced that several banks are considering using it.

Until the PCs were installed last June, all transactions at the Resorts casino had to be recorded by hand. Customarily, players who drop large amounts of money are approached by a pit boss, asked their names and addresses and evaluated on how long they play, how much they play,

A Micro's Eye on the Bandits

Bally Systems has found a way to use PCs to monitor slot machines for malfunctions and tampering.

The casino management system at Resorts International is only one of several uses for microprocessors in its casino. In fact, the CMS was an outgrowth of an extensive slot machine monitoring system now used throughout the gaming industry, designed by Bally Systems, of Reno, Nevada.

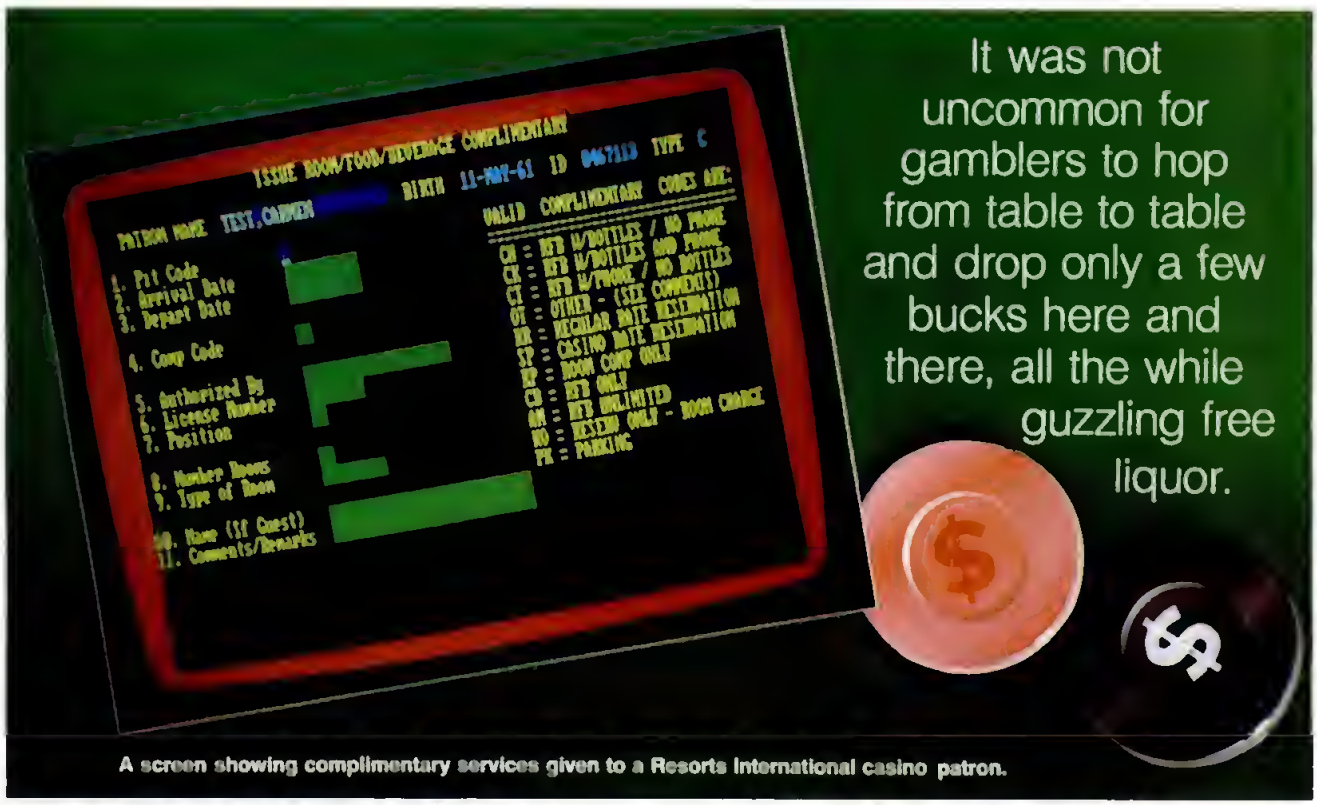
As a mechanical device, the famed one-armed bandits are particularly susceptible to malfunction and tampering. To monitor all the slot machine functions—from every pull of the handle to every jackpot—Bally built a dedicated microprocessor that attaches inconspicuously to its side.

At Resorts International, these black boxes are linked to PDP-11 minicomputers. However, Bally has also devised a similar slot machine management arrangement that can be monitored by the IBM PC.

Bally's Slot Data System V is an offline slot monitoring system with an internal processor that meters information and then transfers it into a hand-held box. The box sends the information to an IBM PC that can handle up to 4,000 slot machines. This system is designed specifically for the needs of Nevada's roving "route operators" who monitor and service their own slot machines scattered in gas stations and diners throughout the state.

The PC-run system monitors 24 slot machine functions. For example, it registers whether the machine is exceeding its payoff (slots are generally set to pay out 90 percent and hold 10 percent of the money), if the machine is paying off with the wrong combination (two plums, one bell), or if someone is trying to beat the machine.

Tamperers generally either break the machine's lock and then arrange the wheels for a jackpot or use a "yo yo," a coin attached to a string and dipped repeatedly into the slot. Caesar's Palace in Atlantic City reportedly lost a million dollars several years ago after some experts opened the machines and arranged a big payoff. Caesar's has since installed the Bally system throughout its casino.—**M.P.**



A screen showing complimentary services given to a Resorts International casino patron.

and how well they play. (Casinos don't care if you win or lose, they care about how much money you "expose." The odds are in their favor if you "expose" enough.) This information had to be scribbled on a slip of paper and shipped over to the cage. So much paper was traveling from the pit bosses to the credit managers to the bank clerks that the information was impossible for management to track. The PCs have solved that problem.

Complimentary services were another problem. It was not uncommon for gamblers to hop from table to table, dropping only a few bucks here and there, all the while guzzling free liquor, noshing on free hors d'oeuvres, and maybe picking up a ticket to the boxing match in the process. If they moved around enough there was no way to monitor how much money each player was losing and how much of this money the casino was making up to him in "comps." Explains Wacker, "Comps are a marketing tool and you want to be able to monitor them properly. You don't want to hand them out indiscriminately."

The PC doesn't let these "double dippers" fall through the cracks anymore. Pit bosses all over the casino can punch up a player's file at any time and see if his amount of play warrants even another free Martini. The file records a variety of complimentary services—including restaurant meals—as well as information on and an evaluation of the player's last four trips to the tables.

A Huge Database

The result of all this data gathering has been an extensive database of Resorts International's gambling clientele. Of course, not everyone who plunks down money makes it into the system—the cutoff point for how much a registered player must spend varies. The PDP-11s are only equipped to handle information on up to 100,000 gamblers; the data processing staff will soon be purging cash customers from the list to make room for more names. However, the Resorts International management is considering a system expansion to 500,000 names.

To some, this kind of database may smack of Big Brother, but Wacker says that tight security in the data processing department protects customer confidentiality. In fact, the CCC has been carefully reviewing the development of Resorts' computer operation the way it investigates everything in that gambling town—from organized crime to every set of dice and pack of cards that changes hands.

Wacker also says that the system can't shift the odds. However, he admits that the long-term significance of the PC system goes beyond management convenience. It can tell the casino which tables are making money, which are losing, and which players are winners or losers. It might even be able to detect a crooked player or employee.

He describes computer management of gambling as an evolving science, but, he says, "we now have the tools to monitor how Lady Luck makes up her mind." ■

Photograph by: Steven Borns



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SCHOTLAND



APPLICATIONS/JOHN CASE

On the Road to AFRICA

An American packs up his PC and ships it to Gaborone, the capital of Botswana in southern Africa. There he deals with heavy dust, weak power, and his new PC user group.

John Case, please call Manica Freight." It was the message I had been waiting for—heralding the arrival in Africa of my IBM PC. I had last seen the machine on a dismal, rainy day in Seattle, and it was now about to arrive in the heat and dust of drought-stricken Gaborone, capital of Botswana. As I set off to collect it, my mind was busy thinking about the many enterprises I had planned for the machine—but Africa is full of surprises. I rushed down to the local freight agents' office only to find that my precious IBM PC had changed identity since I last saw it: from "used personal effects—computer" to "parts of digital data processing equipment." Having been reclassified by South African customs officials, it was now under customs bond. I was not to get the machine into my hands quite yet.

Why take an IBM PC to Africa in the first place? My involvement with Africa dates back approximately 20 years. In the 1960s I joined one of the first Peace Corps groups, went to Africa, and met my wife Sheila, a science teacher from Great Britain. Apart from relatively brief sojourns in England and the States, we have lived in Africa ever since. I taught university and did survey-research studies, simulation modeling, and analytical work related to national development planning.

In 1982 my family and I returned to the United States. I established myself in Washington state's San Juan Islands as an independent microcomputer consultant working with both hardware and software. For use in my consulting work and with a glimmer of an idea that we might return to Africa, I bought an IBM PC.

Return to Africa

For a variety of reasons, after 2 years we did decide that we wanted to return to Africa. Armed with my PC, a technical background, and my experience of how things work in the Third World, I planned to try my hand in the business sector of the southern African economy. Since I had no capital, I intended to carry on as an independent microcomputer consultant doing both hardware and software support for the growing number of microcomputers in Africa. Depending upon potential markets, I also wanted to get into manufacturing. A flexible tool for planning and design, the IBM PC was ideally suited for my needs.



Taking the PC to Africa raised all sorts of questions. How would I get it there? Could it be packed securely enough to withstand the journey? Would any insurer cover it? How would it survive, connected into an erratic 240-volt power supply? What effect would dust have on the disks and drives? Where could I get disks, paper, and printer ribbons?

Figuring it would be better to be safe than sorry, I decided to buy a set of special PC shipping cases to protect the computer on its journey. A few phone calls turned up the information that shipping cases would cost around $500. I ordered a set, calculating wistfully that a similar investment could have bought me 15 boxes of disks or a good compiler.

I knew that there wouldn't be any way of insuring against functional damage in transit, but I felt that I should get some sort of insurance. I had visions of a forklift piercing the side of one of the packing cases. As it turned out, the prices that private insurance companies quoted were so high that it would have been cheaper to purchase a spare computer! I later discovered that air-freight agents carry their own insurance and at very reasonable rates. Unfortunately my machine traveled via air freight for only part of its journey.

The last days before leaving were hectic: handing over my duties as secretary/editor of the local Borderline IBM PC User Group and writing up my last issue of its newsletter, *Bits and Bytes;* copying the User Group's public domain software library; locating spare memory chips; buying disks; informing all the software companies for whom I hold a software license of my change in address (in the unlikely hope that I would be informed of updates); and finally, trying to pack all my equipment in my two new Fiberbilt PC packing cases. The cases were beautiful—they just weren't big enough to hold everything. Careful juggling of computer parts and the rest of the family luggage turned out to be necessary.

The only solution was to pack and ship the PC, its associated cables, some of the manuals, a backup set of my software library, spare printer ribbons, and a few other goodies to keep me going for a while. We carried the original set of my software library together with another backup set, more manuals, parts for a disk drive exerciser, and a few special tools in suitcases or by hand.

Personal Odyssey

In the end, the PC had its own personal odyssey: ferryboat and car from the San Juan Islands to Seattle; regular passenger luggage from Seattle to Prestwick, Scotland; and air freight from Prestwick to Johannesburg, South Africa. Botswana is on the northern border of South Africa and the PC was supposed to travel the rest of the way via air freight. Unfortunately, Murphy's law having worldwide validity, it came by truck from Johannesburg to Gaborone, Botswana, where I live.

Shortly after my arrival in Botswana, I received the first in a series of messages, "Call Emery Air Freight in Johannesburg." I sensed doom. Emery was unable to forward the consignment by air through South Africa to Botswana. It had to be forwarded by "another carrier." This seemed a small enough problem—I was relieved that no malevolent forklifts had been involved. A few days later the "other carrier" called to ask what proportion of the consignment was "used personal effects" and what proportion was "computer." My suspicions that customs problems were on the horizon deepened—but there wasn't anything I could do about it. Although Botswana is an independent African nation and a member of the Organization of African Unity, by necessity it is also a member of a common customs union with the Republic of South Africa, along with both Swaziland and Lesotho.

Finally I received the message that the PC was in Gaborone—In Bond. I wasn't allowed to take home the "parts of digital data processing equipment" because there might be duty to pay. Computers are duty-free but parts of computers are not! I had to use pictures from *PC Magazine* to prove that the monitor, printer, CPU, and keyboard were all parts of the same machine. Finally, 3 days after its arrival and some weeks behind schedule, I was allowed to take possession of my computer.

Since nice, cozy environments for computers are not normally found in Southern Africa, we decided to convert our living room into an office and computer room.

For once I exercised restraint. First I opened the cases and gloated, and then I made a careful check to see that none of the integrated circuits, boards, or plugs had worked loose.

A Tough Life

Nice cozy environments for computers are not normally found in Africa. Until I could get an office, we decided to convert the living room, the largest room in our house, into a combination office, computer room, and electronics workshop. We installed an air conditioner only to find that every time we turned it on the lights dimmed for 2 or 3 seconds. Upon investigation of the electrical system, I discovered that our house was on a three-phase power supply and that one of the phases was virtually unused. Oh joy! (Three-phase power supplies are most unusual in private homes in Botswana.) I quickly installed a completely separate main circuit for the computers (my son also has a microcomputer—a Commodore 64).

The effects of dust on the PC's disks and drives had been one of my most serious concerns. Dust is ubiquitous in many Third World countries, and Botswana is no exception. Most houses have louvered windows and the frames are not carefully sealed. To test the seriousness of the situation, we used the wipe test—clean the desk, wait an hour, and then wipe a finger across it. I have worked in 1-hour wipe-test offices in the past. Fortunately, our living room doesn't have louvered windows, just a huge double-door at one end. Tape and silicone putty around the door frame did the trick: We now have a "24-hour wipe-test" living room.

One problem remained: My PC is a 120-volt, 60-Hz model, while local voltage is 220 volts at 50 Hz. Fortunately I already had a 220-volt to 120-volt transformer and an isolation transformer, both rated at 1,000 watts. I wired both into a computer bench I built out of scraps found at a junk yard. (The difference in line frequency can be ignored unless some kind of timing signal is taken from the line. Luckily, nothing in the PC does so.)

A few days later we were ready to try everything out. I made a quick final check and then switched the machine on. Nothing happened. The bench master switch was off. I turned it on and tried again. The monitor light came on and I could hear the fan. I waited but heard no beep. I tried to remember whether it had taken this long for the PC to perform its internal tests back in the states. Finally a beep and a grind issued from the disk drive. I offered a short prayer of tentative thanksgiving—it works! I found just one problem—an error message indicating that drive A: should be replaced. The problem turned out to be merely a faulty new disk; the drive was fine. My PC had finally arrived.

Computers in Africa

Before coming to Botswana I knew that IBM PCs were being privately imported to South Africa. I also knew that there were

at least three IBM PCs in Zimbabwe, which adjoins Botswana. A search of Gaborone revealed at least seven PCs. IBM had officially started marketing PCs in South Africa during March 1983, a fact that wasn't directly announced in the United States. More recently, IBM authorized an official dealership in Gaborone, to open in the spring of 1984. This will be the first such dealership in an independent black African nation.

The other local IBM PCs are mainly found in big businesses: three accounting and audit firms, two construction companies, and the largest bookstore in the country. The first machine came into the country last October, another one in late December, and the rest since January. Without a doubt, the number of PCs in Botswana will at least double by the end of 1984. After meeting the other users, we all decided to form the Kgalagadi (Kalahari) PC User Group. This is, so far as we know, the first IBM PC user group in an independent black-African nation.

There are nine of us in the group, including one Motswana (a citizen of Botswana). At our first meeting in early March, we raised some of the questions peculiar to our situation: How do we involve our Batswana (citizens of Botswana) colleagues? In what ways might we be of assistance to African users outside Botswana? How can we find out more about the most recent software and where can we get it for a reasonable price? How do we start a literature collection and a public domain software library when we have such difficulty in getting anything? I gave a demonstration of the Norton Utilities and an analysis of South African software price markups using Lotus' *1-2-3*. Since the group is small, I was volunteered to be temporary chairman, secretary, and newsletter producer.

One of the more serious problems our group faces is the wide disparity in levels of education and backgrounds of the members. We have committed ourselves to the involvement of all PC users—but the educational levels range from seventh grade through postgraduate work. The members use PCs for a wide variety of tasks with a fairly definite demarcation between users who carry out professional activities and users who do data entry. A person who can do data entry for a payroll is not necessarily capable of performing a financial analysis using *1-2-3*.

We decided to form the Kgalagadi PC User Group, the first one in an independent black-African nation.



Our members are mainly interested in applications and not in programming. Two of us have extensive programming backgrounds and one member does a bit of BASIC programming and configures *dBASE II* for various applications, but the group's pervasive interest is in what software is available, particularly for business applications, and the relative strengths and weaknesses of the software. Unfortunately our group does not have a wide range of applications software available for evaluation and discussion.

The Next Step

The PC *is* turning out to be an invaluable tool for both consultancy work and feasibility studies. What came as a surprise was the relatively heavy market penetration of microcomputers over a very short period. Just 2 years ago there were only five microcomputer hobbyists in the whole country. Now there are at least six separate businesses selling hardware. Of course, there are still virtually no software or accessories available except for disks and paper, and only one local business has even a modicum of technical expertise. As in the United States many of the salespeople might just as well be selling refrigerators. In a few cases, they are.

The PC and I have gone into partnership with a local Motswana electronics engineer. The PC will perform training and passive solar design analysis. Within the next 3 months we will begin local manufacture and marketing of the *DeSmet C Development Package* for export to neighboring southern African countries. We are also looking for quality software to produce locally under license for distribution in the area. We want to turn a profit, but we also want to emphasize the fact that Third World countries don't have to be left behind.

For the long term, we are beginning to investigate possibilities for local assembly or manufacture of items such as antistatic cleaning compounds, transient-supression devices, stabilized and uninterruptable power supplies, photovoltaic solor panels, and antenna systems for rural satellite communications. The PC is our main design and planning tool, and we would be lost without it. ■

John Case has been working with microcomputers since 1982 and is a founder of Hi-Tech Services, a microcomputer-oriented firm in Gaborone, Botswana.

A Scope for Your Micro

Here's the scoop on Infoscope, a database management program with a unique outlook. You don't have to be a master programmer or learn to think like a computer to use it.

Sophisticated database management programs have traditionally emphasized the programming skills required to create and maintain the database. Retrieving data is a less important, rather routine function in these programs. *Infoscope* turns database management upside down by making the revolutionary assumption that your main interest is viewing the data you have entered.

Instead of servicing the computer, *Infoscope* serves the user. The result of this brave experiment is a program with all the classical database functions—but a completely different structure.

The pivotal element in *Infoscope* is the "scope." Scopes are forms you design to input data as well as windows into the database through which you retrieve data. *Infoscope*'s menus help you build data entry scopes, which can be traditional forms with delineated fields or more free-form records. When you want to view data, you can use the same scope with which you entered it or you can design a new scope to look at your data in a different way. A scope can be associated with a specific data file and stored with that file, or stored independently as its own file.

The *Infoscope* workspace is like a large desktop. You can wander all over the workspace (62 lines by 253 columns), creating scopes of different sizes with different characteristics. While one scope contains a list of clients or of events in your calendar, another might contain a new file you are creating. Up to 12 scopes can be active at the same time, and they can be focused on up to 8 files. Different scopes can give you multiple perspectives on the same data, or identical scopes can look at different data files.

The program lets you specify different colors for scopes in order to tell them apart. A small box on the screen graphically depicts your position in the workspace, and you can ask the program for more detailed maps to get an overhead or sideways view of the workspace.

(continued)

PC MACHINE

Infoscope
Microstuf, Inc.
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Atlanta, GA 30339
(404) 952-0267
List Price: $225
Requires: 192K RAM, two disk drives or one disk drive and a hard disk, PC-DOS, monochrome monitor.

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The Program Generator

Database creation typically involves spending a lot of time using special commands and testing the code you create. Modern database management programs try to make the programming job easier by putting a special overlay called a program generator between you and the database manager. The program generator writes the command language program in response to graphic images you create on the screen.

Infoscope deemphasizes the programming needed to arrange data through the use of an excellent program generator that is always on-line. This program generator does not create code you can review, but the graphic layout clearly describes the fields in every record, the data in the fields, and the relationships among pieces of information.

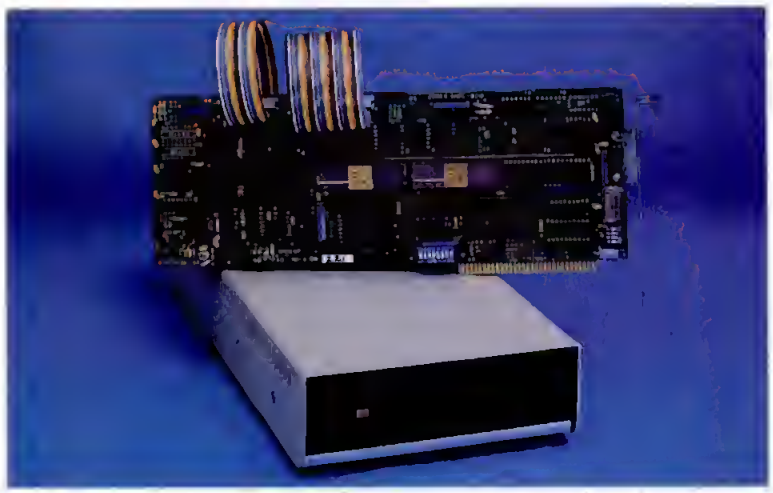
The same screen-driven approach speeds data entry and helps you make changes to both the data itself and the arrangement of the data once it is in the system. You can browse through the records in a file and change their order as quickly as you can enter two or three keystrokes.

Let's examine the database creation process by stepping through a file I actually built with *Infoscope*. I have always meant to catalog the articles I have written over the past 15 years. *Infoscope* has proved to be a perfect tool for creating this kind of database.

When I started to build my database of published articles, I used *Infoscope*'s menu structure to find the CREATE command. *Infoscope* has seven tiers of menus with eight logically grouped commands in each tier. You can either use the spacebar and backspace key to place the cursor over a command or enter the first letter of the command and hit the Return key. Of course, if you know the commands you want to use, you can simply enter their names and skip the menus entirely. *Infoscope* supports several companies' mouse devices, which can also be used to enter commands.

The arrow keys move a standard cursor across the main screen area. If you are issuing a command such as COLOR or RENAME that applies to a particular scope, you move the screen cursor to indicate the scope and the command cursor to indicate the command. The Tab key moves you among the menu layers.

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Infoscope's commands are all logical, descriptive English words. In several cases the program is loaded with different commands that do the same thing, so if you aren't sure of the name of a command, you will probably be successful by guessing. If you don't think the standard commands are descriptive enough, you can add to the list any words in any language you can type on the screen.

Category	Explanation
Character	Text and numbers
Integer	Whole numbers without decimal places
Data	In several different formats
Time	Either 12 (AM PM) or 24-hour format
Stock	Can use fractional formats such as 5½
Category	Selected items checked for spelling
Counter	For part numbers, stock numbers, etc.
Switch	Yes or No responses

Figure 1: *The eight* Infoscope *data entry categories.*

Infoscope will read the commands you enter, and if you make a typing error, the program will suggest a command it knows with a spelling that is close to what you have typed. If you enter new words into the command list, the spelling checker will learn them.

Naming Fields

In building my database, after I selected the CREATE command, the program asked me a series of questions about the data I wanted to enter. First it asked me to name my first data field. I labeled it "Publication."

Infoscope can discriminate among many different types of data (see Figure 1). It will format the characters you enter according to the kind of data you tell it to expect in a field, and it protects you by refusing to enter any data that do not match your specification. Since the Publication field in each record would contain the name of 1 of only 15 publications, I told *Infoscope* to consider this field a "category." *Infoscope* adds items you designate as categories to its vocabulary list and helps you to spell them correctly.

Other fields in my data entry form include the title of the article, a general description of the topic, the number of



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CIRCLE 452 ON READER SERVICE CARD

pages, and the date of publication. *Infoscope* is particularly flexible in handling dates. You can enter them in several ways, such as May 2, 1984, or 5/2/84. The program understands these different formats and can effectively sort mixed entries according to the dates you supply.

Once you have defined the way the information in the database is to be arranged, you have to be able to enter your data quickly and efficiently. Equally important, however, is the ability to update information in the database or to add new fields to every record. An inflexible electronic database may be worse than no electronic database at all. The *Infoscope* graphics program generator allows you to make changes to the structure of your data or to individual records at any time. You can even have different versions of the same form active at the same time.



This scope is looking at a data file called ARTICLES. The focus has been narrowed so that only records with PC in the publication field are displayed. The records are sorted according to their dates. You would have to scroll the screen with the arrow keys to read the subjects that run off to the right. The menu at the bottom of the screen is ready for selection. The small box in the bottom right-hand corner shows where you are working in the total available field.

The Main Event

Infoscope does a good job of helping you design the database and getting the information into the computer, but its strength is the speed and flexibility it gives you in retrieving information. You can get at information with the same scope you used to enter it, but you probably only want to see specific records. The FOCUS command helps you select just the information you want to see from your file.

The FOCUS command has over 40 specifications, which are descriptive words that allow you to select records in a file, such as *equals*, *includes*, *larger*, *smaller*, *or*, *not*, and *is*.

For example, if I want to see all the articles I've written on data communications for *PC Magazine* in 1983, I would type:

```
FOCUS Publication is "PC" and
Date has "1983" and Subject
is "communications"
```

The program would sort through the data file and only display the records meeting those criteria. This command description is logical and simple to construct, but the unique aspect of *Infoscope* is that these are not the only words that will give exactly the same results. Here are some other command lines that will retrieve the same data:

```
FOCUS Publication equals
#PC" and Date ends "83"
and Subject contains
"communications"
```

or

```
FOCUS Publication = "PC" and
Date includes "1983" and
Subject has "communications"
```

Words or symbols such as *is*, *equals*, =, *same*, and *be* all have the same meaning and can be mixed with many other words to describe the information you want.

Conditions you can use with the FOCUS command allow you to add a different criterion to a command line you have already entered or ignore a certain portion of a command in the system. The program will even look for a close match for a name or word in a field you specify in a FOCUS command. You can type in a command line such as

```
FOCUS name SOUNDS "Freed"
```

and the program will look in the Name field for words that have the same first letter and other similar characteristics.

After you have created a focus, the scope you are working with will display the records in the file that meet the criteria. If there are more than a few records in the scope, you can use the PgUp and PgDn keys to scroll through them. With the SORT command, you can sort the records in the scope in ascending and descending numeric or alphabetic order in the field you specify. You can find specific records among the records that you have already focused and sorted by specifying a criterion, for example: for a specific field

```
FIND NAME = "Charles M.
Russell".
```

In my article's database, when I am interested only in the number of articles pub-

lished within a certain period of time in a certain magazine, I can ask the program to count the number of records meeting a focus specification or even to average the number of pages shown in the Length field.

Once I have used FOCUS to describe the records I want to see in a scope, I might decide that I need to see only the title and date of each article. I can use the HIDE command to eliminate the fields I don't want from view or the SHOW command to display only those fields I am interested in. In every case, the response to an *Infoscope* query is very fast.

Ad Hoc Queries

If you want a specific retrieval on a regular basis, such as a monthly listing of new employees, you can describe the criteria for retrieval and save them in the *Infoscope* command language so you can run the query quickly and consistently each month as a standard report. You can print the resulting report in a standard format with each item arranged the way you want it and appropriately labeled. You also have the option of stringing single reports together into a standard package.

A one-time or infrequent retrieval is termed an "ad hoc" request. Ad hoc requests are best handled through *Infoscope*'s query language, a subset of the full command language. Query languages that allow you to state your needs quickly and simply are a new and highly publicized feature of many mainframe and microcomputer database management systems. Responses to ad hoc requests are often poorly formatted and labeled, but that is usually considered part of the price you pay for fast and informal retrievals.

Here *Infoscope* has once again turned things upside down. While it produces standardized reports as well as the next database program, its emphasis is on giving you the ability to make quick and well-formatted ad hoc queries.

The query language contains multiple redundant commands that are common English words. If you want to see all the data in a file, for instance, you could type ALL, EVERYTHING, or ANYTHING and get the same results under most conditions. If you find those words hard to remember, you can add other words and equate them to *Infoscope*'s original commands. This feature can also be used to customize *Infoscope* for languages other than English. The ability to use several different words to accomplish the same task makes the program work much like humans work.

When you want to print out the information you have focused on, the PRINT command allows you to print the records contained in a particular scope. You can print the scope with or without the headings, and if your printer is capable of printing different fonts, *Infoscope* will allow you to use different fonts for the name of the scope, the focus specification, the sort specification, the header area, and the data area.

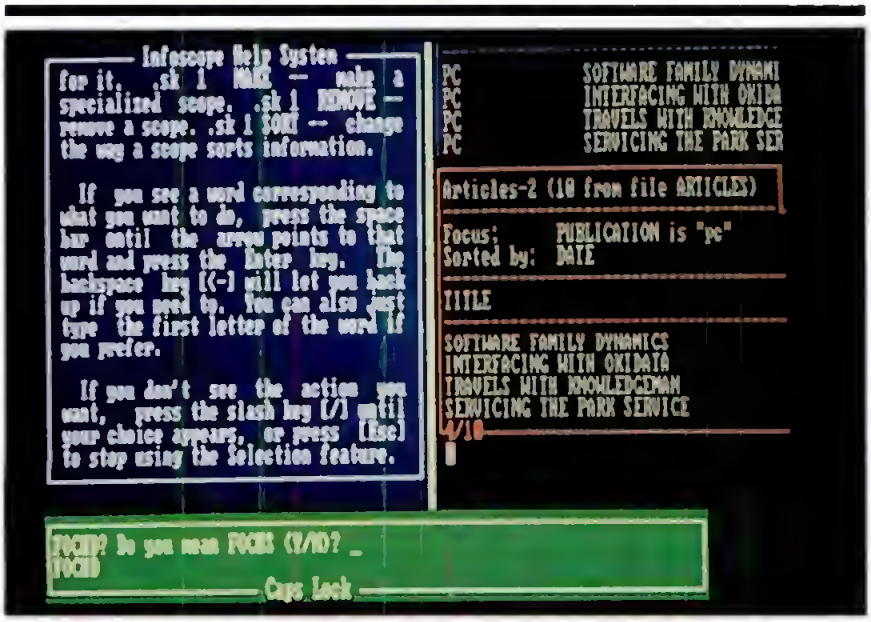
But simply printing out the focused data with pretty fonts does not produce the professional-looking reports you want to put in front of your boss or client. The *Infoscope* REPORT command allows you to set up borders, page numbers, headers, footers, and other formatting criteria. Since you don't want to recreate these factors each time you make a report, the program will save the report format. Once you have created the format, even people who have never used *Infoscope* can print standard reports from the current data in the file.

Finishing Touches

Infoscope has some interesting extras. One relatively unique feature is the ability to simultaneously enter data into multiple files. The program can also make simultaneous queries to different files or multiple queries to the same files using different criteria.

Another nice touch lets you help inexperienced users work with the program. You can create a command file that sets up the program and asks for specific keyboard inputs. Such a command file lets *Infoscope* practically run itself, and anyone can easily update a file, enter new data, or retrieve information.

Even a program as understanding as *Infoscope* can be confusing if you don't



The *Infoscope* help commands bring a detailed description of the menu options to the screen. You can hold this explanation on the screen or wipe it away after you have read it.



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Infoscope's Human Instincts

The people behind Microstuf's new database manager talk about the program and its development.

When you mention the name Jeff Garbers to professionals in the microcomputer industry, many of them draw a blank. But when you say, "You know, the tall guy at COMDEX," they almost all know who you mean. Garbers, 6 foot 9 inches, has a real advantage in the crowded aisles at computer trade shows.

Garbers is the author of *Infoscope*. He worked closely in the production of the program with Les Freed, the president of Microstuf, Inc. Garbers and Freed also worked together on the latest version of *Crosstalk*, the popular data communications program that Microstuf has marketed since 1978.

Both believe that the human factors involved in computer software are just as important as the more technical aspects of programming. Garbers left a Ph.D. program in computer science at Georgia Tech because it focused on the theoretical aspects of programming as opposed to the human view. In developing *Infoscope* he worked closely with one of the recognized experts in the field of human factors, Dr. Albert Badre.

Human Interest

"The computer does not end at the terminal," says Garbers. He claims that he has tried to give the program the ability to understand commands in human terms instead of imposing computer-like thinking on people.

Infoscope wasn't ready for its initially announced release date of August 1983. However, Garbers and Freed stress that the mature program now on the market met and surpassed its design goals.

According to Garbers, "The release of the program was delayed because we were pushing our programming tools to their limits. *Infoscope* is made up of over 80 assembly language modules, and we used up the full capacity of the linker to put them together. We kept trying to cram in just one more thing.

"Making the help messages sensitive to the context of the work on the screen was a detailed chore. But when you ask *Infoscope* for help it gives you more than a generalized response. It looks at what you are working on and tries to give you a really meaningful response."

Garbers' study and consultations on people's perceptions of software show that they feel better about programs that they can personalize to match their own style of work. The capabilities Garbers has put into *Infoscope* allow a person who is relatively unfamiliar with either the program or computers to change many things: the color of the screen, the way commands are displayed, and even the way the computer system talks to the user. Changing styles of presentation and operation give a person a feeling of mastery over the program that extends to the more difficult tasks.

Garbers and Freed both criticize rigid menu structures. *Crosstalk* and *Infoscope* have command systems that allow you to either enter a command directly or select from a menu. Garbers says, "There is a lot more to ease of use than counting keystrokes. The time the task takes and the number of cognitive steps involved are bigger parts of the equation. *Infoscope* lets you link together cognitive steps, like the criteria in the FOCUS command, so they make sense. We think this is better than breaking up operations in ways that only make sense to computers." —**F.J.D.**

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INFOSCOPE

know where to start. *Infoscope* comes with a large file of helpful explanations you can call from the screen, a good manual, and an excellent tutorial. The on-line explanations are keyed to the commands

Analyze the size of your database before you commit yourself to a RAM-limited database manager.

you are working with when you ask for help. Each explanation lets you move through several levels of detail. I used a draft of the manual, which contained good explanations, examples, and lists of commands. The *Infoscope* tutorial combines a self-running program with opportunities for you to make your own inputs and changes to the data. The tutorial is probably the fastest and certainly the most rewarding method of learning how to use the program, but if you prefer you can work through the menus and information screens.

Infoscope's speed and user interface take their toll in system capacity. The program's major limitation is that everything must reside in RAM, so the amount of data you can manipulate is restricted by the amount of RAM you have. This limits *Infoscope*'s usefulness to applications in which the data are broken into many separate files or in which only one file of moderate size is used. You must carefully analyze the size of your database before you commit yourself to a RAM-limited database manager.

If you can live with limited RAM, *Infoscope* is an appealing program. Easy for inexperienced users to learn but complex enough to interest technophiles, this fast and flexible database manager has something for everyone. ■

COBOL with a Personal Touch

The Personal COBOL package offers a COBOL subset for programmers who prefer using the PC.

Seizing upon the trend toward integrated software, the folks at Micro Focus, Inc., have produced a multifunctional COBOL development environment for the IBM PC. Personal COBOL is flexible and powerful enough to interest not only PC applications developers, but also the increasing number of mainframe COBOL programmers who use the PC to produce initial source code.

The Personal COBOL package contains a program editor, syntax checker, COBOL interpreter (called the Animator), and a nifty forms-painting facility that produces screen-handling source code. A separate compiler (see sidebar) is available at additional cost. The software comes on a systems disk and an example disk, along with a reference manual, operating guide, and introductory primer.

Personal COBOL
Micro Focus, Inc.
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Requires: 256K RAM; two disk drives or a hard disk.

CIRCLE 658 ON READER SERVICE CARD

Two major audiences will be attracted to the Personal COBOL package. The first is composed of individuals writing commercial applications for use on the IBM PC. COBOL has long been the language of choice for writing accounting, inventory, sales, and other business software. Personal COBOL is a fine tool for the software developer who wishes to produce high-quality work, because so much of the testing and debugging is simplified by the Animator. The tested source code can then be compiled by using the separate Level-II compiler for distribution.

The second audience for Personal COBOL is the growing legion of mainframe programmers who find it convenient to write their programs on a personal computer and then upload the tested source code to the big machine. PCs are already replacing dumb terminals at many large companies. As this trend continues, the efficiency and ease of use afforded by interactive program development tools will become increasingly important. Micro Focus has made a terrific contribution to this process, and Personal COBOL deserves serious consideration by individual and corporate software developers.

The COBOL Subset

Personal COBOL is actually a subset of Micro Focus' Level-II COBOL compiler (see sidebar), which is a full implementation of the 1974 Federal High-Level ANSI

COBOL standard. The COBOL nucleus is augmented with modules for table and file handling, sort-merge, segmentation, library usage, linkage, communications, and debugging. If you're an experienced COBOL programmer, you'll immediately feel comfortable with the scope of this subset since most of your favorite features are probably there.

My only major peeve is Personal COBOL's lack of the COBOL Report Writer feature.

Personal COBOL does have some extensions to standard COBOL, but a few standard features are missing. The most important extensions were added in order to make full use of the IBM PC. Thus, you can code clauses in the Special-Names paragraph of the Environment Division to assign mnemonics to the keyboard (SYSIN), the crt screen (SYSOUT), and to printer functions (formfeed, tab). If you declare CONSOLE IS CRT, you can then use the extended Accept/Display syntax to control screen input/output. You can even capture the cursor address during an accept operation.

The Personal COBOL subset supports indexed, sequential, relative, and line-sequential (text) file organizations. All the familiar data representations are available. In addition, you can express a hexadecimal value in a nonnumeric literal by coding "X 'nn'," where 'n' is a hex digit. The Procedure Division hosts just about every verb you'd ever think of using, as well as one you should religiously avoid (the dreaded ALTER verb). I happen to like the STRING, UNSTRING, and INSPECT verbs, all of which are happily included. Alas, this implementation left out EXHIBIT, which I find useful for debugging. Micro Focus no doubt felt it unnecessary, given the built-in debugging power of the Personal COBOL package.

Micro Focus has customized Personal COBOL to fully utilize the IBM PC keyboard. The function keys can do triple duty, depending on whether they are pressed by themselves or in conjunction with the Alt or Ctrl key. In general, function keys alone perform the major tasks appropriate to the work you're doing, whether it is editing, checking, or executing a program. The Alt key redirects the function keys to perform library tasks, such as loading and saving text and forms. Finally, the Ctrl key allows the function keys to perform cursor and screen control tasks, including scrolling. The system displays the meaning of each function key at the bottom of the screen. If they aren't clear enough for you, press the friendly F1 key for Personal COBOL's help screens, which are genuinely helpful.

Two Peeves

I encountered a minor problem using the ASSIGN clause of the SELECT statement. The documentation is unclear when it comes to external file names, and only through experimentation did I discover the proper method for specifying a disk file name: SELECT a file and ASSIGN it to a data name, such as "FILE-ID." Then, in Working-Storage, declare "FILE-ID" and give it a VALUE of a legal DOS file name, such as "B:MY.FIL".

My only major peeve is this package's lack of the COBOL Report Writer feature. I use this feature extensively in my mainframe work, and frankly, I consider manual report generation a giant step backwards. Micro Focus could easily delete the Communications Section of the Data Division (I've never seen it used) and replace it with the Report Section to be used with the Report Writer feature. Doing so would bring this COBOL implementation up to full mainframe potential, which is quite a feat for personal computer software.

Personal COBOL sports a full-screen program editor. Up to 20 lines of text are displayed on the upper portion of the screen. Beneath an end-of-text line is a display of file name, file length, cursor position, and special-key status. The next two lines reveal the function key definitions. The bottom line is used to display messages.

Enter the Editor

You enter the editor by pressing F2 on the main menu. The screen top informs you that the work file is empty. You can start entering a new program immediately, or you can press Alt - F3 to load an existing file from storage. If you can't remember the file name, F2 will display the file directory: move the cursor to the desired file and hit Enter to load the file into the work area.

There are no line numbers with this editor. Proper selection of function keys allows you to insert, delete, undelete, and repeat lines and/or characters, and to split and join lines of text. You can move the cursor using the numeric keypad's cursor control keys or by pressing the F9 or F10 key to shift the cursor one word to the left or right, respectively. The current line is always highlighted. You can scroll up or down using Ctrl-F3 or -F4, and the Home and End keys bring you to the start or end of text. To find (and optionally replace) a character string, you start by pressing Ctrl-F5, but this procedure becomes a bit unwieldy—you must use several additional function keys to specify the various parameters of the find/replace operation.

Although this editor is head-and-shoulders above EDLIN, it is outclassed by the best of the program editors available for the PC (see "Friendly Program Editors," *PC*, Volume 3 Number 6). It has no block commands for moving and copying text. Tabbing is not programmable and is limited to 4-column increments past column 8. You cannot easily make global changes to text; rather, you must find and replace each occurrence of the target text, which is a cumbersome process. Split screen is available, but the same file is shown in both halves. I would have liked to see the capability to look at two different files simultaneously. On the plus side, you can

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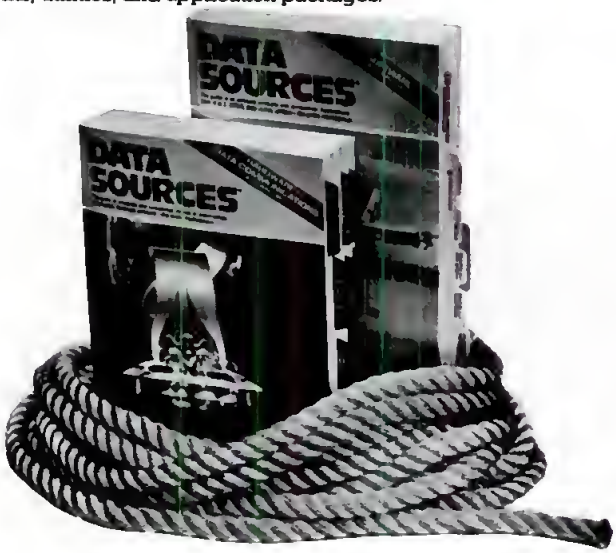
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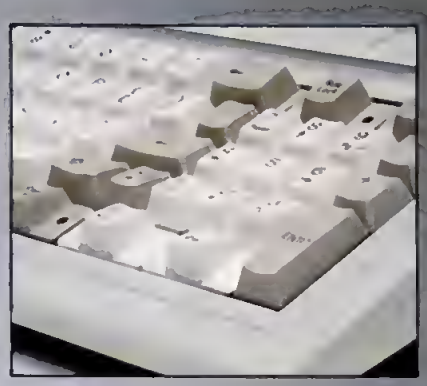
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More COBOL Software

Micro Focus offers a full line of COBOL products that have been specially designed to run on the PC.

The Personal COBOL package reviewed here includes an editor, syntax checker, screen painter (Forms), and COBOL interpreter (the Animator). But Micro Focus offers an array of additional COBOL products that should satisfy every conceivable user.

Two generic COBOL compilers are available as of this writing (April) and a third, specifically tailored to the IBM PC, was scheduled for release in May. The two compilers that are currently available are:

- High-Performance Level II COBOL ($1,995), which compiles COBOL source statements into abstract intermediate code to be processed by the accompanying Run-Time Support (RTS) package. RTS converts the intermediate code into machine language instructions, which are then executed by the CPU. Alternatively, the intermediate code can be recompiled directly into machine language by the 8088 Native Code Generator supplied with the compiler. This recompilation relieves RTS from the task of converting intermediate code into machine language. It also locks you into a particular native code, so if you want to have a transportable executable program, better to leave it in intermediate form.

- Compact Level II COBOL ($1,595) is similar to the high-performance compiler but produces only intermediate code. This compiler's RTS must always convert the intermediate code to machine language at execution time. It has been designed to require less memory and disk space, which can be important if you are programming with limited hardware resources.

Just to make sure they've covered all bases, Micro Focus markets the heart of the Personal COBOL package—Animator ($795) and Forms II ($195) as separate products for use in conjunction with their compilers.

I was able to run some tests on the High-Performance compiler using programs developed with the Personal COBOL package. First, I tried to compile the Forms-generated ISAM-processing program that was described in the main article.

Forget it! Apparently the special characters and syntax associated with the extended ACCEPT/DISPLAY screen capabilities of Personal COBOL were not compatible with this compiler. Thus, you cannot use the Personal COBOL Forms facility in conjunction with the High-Performance compiler. Micro Focus states that the new PC-tailored version of its compiler will be compatible with Forms.

I next wrote a short test program with Personal COBOL that outputs a sequential file of 100 80-byte records. The High-Performance compiler handled this one nicely. I was able to run this test using both the intermediate and native-code outputs of the compiler.

Surprisingly, the execution times for the interpreted, intermediate, and native-code versions of the test program were essentially identical. This is probably due to the predominantly I/O nature of the program; execution time was constrained by the disk drives. A program more evenly balanced between calculations and I/O would probably yield very different results. In this case, the native-code program would be significantly faster than the intermediate and interpreted versions.

With all the purchasing options available from Micro Focus, you may be a little confused as to the best way to spend your hard-earned dollars. Here are some guidelines:

- If you are planning to write programs for your own amusement, or if you are developing programs on the PC for subsequent use on a mainframe, then you need not invest in a compiler at all. Personal COBOL will execute your programs quickly enough for most purposes.

- If, on the other hand, you plan to market COBOL programs to run on the IBM PC, you'll want to invest in the soon-to-be-released Level-II compiler specifically tailored to the PC, as well as the Animator and Forms. Hopefully, the new compiler will be 100 percent compatible with Forms. Since you won't be buying Personal COBOL, you'll need to invest in a separate program editor.

- Finally, for COBOL developers requiring the maximum in hardware/software flexibility, think about getting the Compact Level-II compiler, along with Animator and Forms II and a good program editor. The intermediate code produced by this combination can be packaged with a Micro Focus RTS package (which is available in such interesting flavors as CP/M and UNIX) appropriate to your requirements.—**E.B.**

edit a copy file by placing the cursor on a program's copy statement and pressing Alt-F5. The editor will then load the copy file you have indicated.

When you're finished editing your file, Alt-F4 will save it to storage. The system displays a warning message if you're about to overwrite an existing file and asks for your permission before continuing.

I was curious whether *SPF-PC*, my favorite full-screen editor, could create COBOL code fully compatible with the Personal COBOL editor. A short test program proved this to be no problem. The editor is good enough to do the basic tasks of creating and changing COBOL source programs. However, it lacks the conveniences professional programmers have come to expect from an editor. It is the weak link in the Personal COBOL integrated chain.

The Syntax Checker

After editing your COBOL masterpiece, press F3 on the main menu to initiate the syntax checker. You cannot avoid this step: Personal COBOL simply will not execute an unchecked program. The main check menu lets you direct the source code display to the printer. You also can specify whether the checker should pause following each error (Pause mode).

Enter or select the file name to be checked and press Return to start the process. Each line is displayed or printed as it is checked. In Pause mode, the syntax checker will generate a diagnostic message when it detects an error and ask your permission to continue. If you decline, the checker graciously yields the floor to the editor, which automatically positions the cursor at the offending bit of code. After applying corrections, you can start the checking process all over again. Upon completion, the checker will display the error count and program size.

The syntax checker proved reliable, fast, and easy to use with no bad habits.

The Personal COBOL Animator is a full-fledged execution and debugging environment. Pressing F4 on the main menu invokes the Animator. Although the system assumes you want to execute the program just checked, you can enter/select a different program, as long as the latter has been checked. If you simply wish to run the program without debugging, pressing the F3 key puts you into Zoom mode. Hit the Enter key, and your program executes normally.

The Personal COBOL Animator is a full-fledged execution and debugging environment.

The fun part of the Animator becomes apparent when you decline to use the Zoom option. In this case, the program's Procedure Division is displayed on the screen. Each line of code is highlighted as it executes. Function keys are used for screen and cursor control. Besides the normal function key list at the bottom of the screen, the Animator displays a list of one-letter commands you can use to customize the debugging session. You can (S)tep through each statement sequentially, you can set a relative execution speed and make the program (G)o, or if you've had enough debugging, you can (Z)oom to completion.

Further execution control is available by jumping to the NEXT-(I)F statement in the program, and by (R)esetting the cursor at any time to a different statement. Additionally, you can set a (T)hreshold-level of nested performs and calls, below which only zooming occurs.

Control breaks can be established in various ways. You can specify (B)reakpoints at any location in the program. The (E)nvironment can be set to cause a break whenever selected programs are called, and you can state a condition using COBOL syntax which will not cause a control break (U)ntil the condition is true.

Once a break occurs, you may wish to (Q)uery the contents of a data item or perhaps immediately enter and (D)o a COBOL statement. If your program uses screen displays, you can toggle F2 to alternately view the executing code and the program-generated screens. Other interesting options are to (F)ind the next occurrence of a character string or to (L)ocate the next reference to a given data name, file name, or paragraph label.

I had only a few minor quibbles with the Animator. You are limited to a single global condition break, (U)ntil, and to a single data item to constantly (M)onitor. Also, the split screen capabilities of the Animator appear to have little value. But, as you can see, the scope and control of the Animator is tremendous. If you haven't experienced the pleasures of real-time debugging you may find the large array of features bewildering. My advice is to hang in there—once you've mastered the Animator, dump-busting and READY TRACE will seem as archaic and primitive to you as stone knives.

Forms

Personal COBOL comes with an unexpected yet welcome bonus—screen painting. To enter Forms mode, select F2 while in the editor. You can now draw a new screen or load one from storage.

Pressing F2 on the Forms menu toggles you between text and data drawing. Text drawing is used to create display literals. You can manipulate the appearance of any text string by setting its one-character attribute byte using the function keys. Indulge your artistic sensibilities by changing the color (foreground and background) or intensity of a text string. You can even make it blink. You may use any character in the IBM PC set by selecting from a list at the bottom of the screen. F3 or F4 moves the selection to the left or right, and F5 paints the chosen character on the screen. Pressing the Ctrl key in combina-

tion with the cursor control keys supplies you with preformed corners and vertical lines for box drawing.

Once you're happy with the text screen's look, toggle to the data screen to define variables. Simply draw the picture of any data item by using the standard COBOL editing characters: X for alphanumeric, 9 for numeric, Z for zero suppression, and so on. The available editing characters are thoughtfully displayed at the bottom of the screen. The previously drawn text is visible on the data screen, making it easy to align variables with literals. When you finish painting, save the form with Alt-F4.

> Once you've mastered the Animator, dump-busting and READY TRACE will seem as archaic as stone knives.

So far, you've drawn and saved a display screen (Figure 1). The next step is to create the COBOL code to define and use the screen. Personal COBOL assists you by providing a program, SKELETON (Figure 2) on the example disk. This program predefines several data items that the screens require. You must load SKELETON into your work file and place the cursor on the indicated comment line in the Working-Storage Section. Next, press Alt-F5 for the Generate COBOL menu, then F2 to have Personal COBOL create a Data Division copy element defining the screen (Figure 3). The appropriate COPY statement will appear in your work file at the point where you placed the cursor.

Return to the Generate COBOL menu, and use the F3 key to generate in-line Procedure Division code (Figure 4). This code will DISPLAY the screen and ACCEPT the first variable data item. At this point you should save the work file (rename it first so as not to destroy the SKELETON program).

The entire process is easier to do than to explain. The generated code performed correctly with several test screens and saved hours of work. While COBOL is not my language of choice for screen processing, I commend Micro Focus for including the time-saving Forms facility in this package.

One additional Forms feature deserves mention. Instead of generating fragments of source code, you can instruct Forms to create an entire Indexed Sequential Access Method (ISAM) file maintenance program. This can interactively add, change,

```
                THIS IS A TEST OF THE MICROFOCUS COBOL FORMS DESIGNER

Tester:
Date tested:                          Time tested:

This line will be green.              this line is red on yellow.
                                      This line will blink.

This line will be bright.

this line is reverse-vide:
                                      Special chars here - ¤()à

Forming-TESTFORM-Text--Attribute-0000-0RGB-007--Cursor+0101--Ins-Caps-Num-Scroll
F1=help F2=text/data F3/F4=insert/delete-line F5=repeat-line F6=restore-line
F7=retype-char F8=restore-char F9=repeat-ch F10=paint-attr Alternate Ctrl Escape
```

Figure 1: *A display screen created with the* Personal COBOL *forms designer.*

```
      * Put cursor here before entering FORMS (F2) to design your form
      * and generate "data-descriptions".
      * Remember to move cursor down past PROCEDURE DIVISION heading
      * before re-entering FORMS to generate "procedure-statements".

       PROCEDURE DIVISION.
      * Put cursor here for "procedure-statements".

       TFDATA.
           DISPLAY SPACE UPON CRT.
           MOVE 1680 TO IO-LENGTH.
           MOVE 1 TO SCREEN-OFFSET BUFFER-OFFSET.
           CALL SCREEN-IO USING WRITE-ATTR FORM-PARAMS   TFDATA-00-ATTR.
           DISPLAY   TFDATA-00 UPON CRT.
           DISPLAY   TFDATA-01 UPON CRT.
           ACCEPT    TFDATA-01 FROM CRT.
           DISPLAY   TFDATA-01 UPON CRT.
       TFDATA-END.

           EXIT PROGRAM.
           STOP RUN.
Editing-new-file----79-lines-------Line-40-------Col-8----Ins-Caps-Num-Scroll
F1=help F2=forms F3/F4=insert/delete-line F5=repeat-line F6=restore-line
F7=retype-char F8=restore-char F9=word-left F10=word-right Alternate Ctrl Escape
```

Figure 2: *The SKELETON program, which lists required fields for designing forms.*

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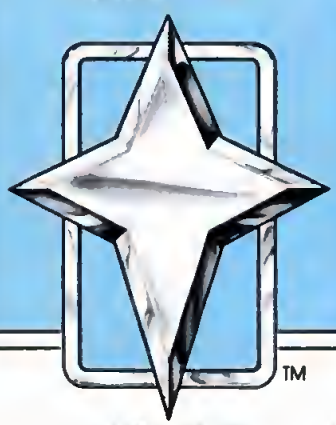
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delete, and retrieve records on an ISAM file composed of the variable data items from your screen. Paint the screen as usual, then press Alt-F10 to mark the data items that are to be the index key fields for the file. Hit F4 on the Generate COBOL menu, and voilà! A working program appears. The generated program had flaws: meaningless data-item names, unindexed paragraph labels, and GO TO's. Still, this is one of the quickest ways I've seen to create a simple application. ■

Eric Bank is a data processing consultant specializing in COBOL-based commercial applications.

```
      *====== Skeleton Program for use with PERSONAL COBOL FORMS. ======

       WORKING-STORAGE SECTION.
      * The following fields will be required if you use FORMS (F2)
      * to generate procedure code for screens using attributes.
       01  SCREEN-IO           PIC X              VALUE X"87".
       01  WHITE-ATTR          PIC 99      COMP   VALUE 3.
       01  FORM-PARMS.
           03 IO-LENGTH        PIC 9(4)    COMP   VALUE 1680.
           03 SCREEN-OFFSET    PIC 9(4)    COMP   VALUE 1.
           03 BUFFER-OFFSET    PIC 9(4)    COMP   VALUE 1.

      * Put cursor here before entering FORMS (F2) to design your form
      * and generate "data-descriptions".
      * Remember to move cursor down past PROCEDURE DIVISION heading
      * before re-entering FORMS to generate "procedure-statements".

       PROCEDURE DIVISION.

      * Put cursor here for "procedure-statements".

Editing-new-file----61-lines-------Line-1--------Col-8----Ins-Caps-Num-Scroll
F1=help F2=forms F3/F4=insert/delete-line F5=repeat-line F6=restore-line
F7=retype-char F8=restore-char F9=word-left F10=word-right Alternate Ctrl Escape
```

Figure 3: *A Data Division copy element that defines the screen painted by Forms.*

```
      -    *-------------------------*.
           03 FILLER          PIC X(0179).
           03   TFDATA-00-0707 PIC X(0007) VALUE "Tester:".
           03 FILLER          PIC X(0153).
           03   TFDATA-00-0907 PIC X(0012) VALUE "Date tested:".
           03 FILLER          PIC X(0026).
           03   TFDATA-00-0945 PIC X(0012) VALUE "Time tested:".
           03 FILLER          PIC X(0190).
           03   TFDATA-00-1207 PIC X(0024) VALUE "This line will be gree
      -    "n.".
           03 FILLER          PIC X(0173).
           03   TFDATA-00-1444 PIC X(0022) VALUE "tThis line will blink.
      -    "".
           03 FILLER          PIC X(0101).
           03   TFDATA-00-1607 PIC X(0025) VALUE "This line will be brig
      -    "ht.".
           03 FILLER          PIC X(0135).
           03   TFDATA-00-1807 PIC X(0027) VALUE "This line is reverse-v
      -    "ideo.".
           03 FILLER          PIC X(0091).
           03   TFDATA-00-1945 PIC X(0025) VALUE "Special chars here - @
Editing-TFDATA-----49-lines-------Line-21-------Col-8----Ins-Caps-Num-Scroll
F1=help F2=forms F3/F4=insert/delete-line F5=repeat-line F6=restore-line
F7=retype-char F8=restore-char F9=word-left F10=word-right Alternate Ctrl Escape
```

Figure 4: *Procedure Division code that displays the screen defined in Figure 3.*

A Brush with Fun

ROLLO is a creative painting game that comes through with flying colors, but B-1 Nuclear Bomber and Computer Football Strategy are not even in the picture.

Every time I try to imagine the R&D session at Windmill Software's corporate offices where this game was created, I come up with the picture of a wild party featuring the Marx Brothers, Monty Python, and a large number of tequila sunrises.

In a word, *ROLLO* (or to use its full title, *ROLLO AND THE BRUSH BROTHERS*) is bizarre. It's also a whole lot of fun, as long as you're not called upon to prepare a synopsis of the story line for your "Classics of Western Literature" symposium.

Here's the plot, as outlined by Windmill Software: "As ROLLO, the brilliant star of our scenario, your aim is to paint squares around the bristly BRUSH Bros., Harry, Perry, and Swipe. Their old-fashioned brushes prove strong competition, but you're the bright, new breed—rollering wall after wall of glorious, streaming color. Take care to plan your strokes, for while you're hard at the job, the bothersome Brothers' aim is to see you all washed up.

"You've got to out-stroke, out-color, and out-roll the whole bristly crew. They'll bully you into a corner and make off with your paint, but you'll be ready with a quick toss of a bomb.

"You slap on the first coat, then the second, and faster than the flap of a bristle, the third coat's dry and you're on your way to a higher level. The color chart at the top of the screen points the way to finish the job.

"Just as you've mastered your strategy, the BRUSH Bros. add to the rules! In the second level, one coat of paint does the whole job, but now your roller keeps running out, forcing you to dash back to the nearest bucket. This level ends when all your buckets run out."

Whew! Sounds about as exciting as

ROLLO
Windmill Software, Inc.
P.O. Box 1008
Burlington, Ontario L7P 3S9 Canada
(416) 336-3353
List price: $39.95
Requires: 64K RAM, color/graphics adapter, color monitor recommended, joystick and game adapter optional.

CIRCLE 795 ON READER SERVICE CARD



A second-level *ROLLO* screen showing paint buckets.



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CIRCLE 150 ON READER SERVICE CARD

PC ARCADE

watching paint dry, doesn't it? But, like a tube of oil paint, this little number sticks with you. The play action is quite good when you use the keyboard's cursor pad (the joystick version is more sluggish), and the graphics and sound are lively. Your roller is pursued by two types of tormentors: slow-moving counter-brushes and a speedy bristle brush that sweeps around the screen like Walt Disney's broom in *The Sorcerer's Apprentice*. You are also granted five spray bombs that you can use to temporarily remove your attackers from the screen. The art of bombing, though, is an acquired skill—the timing must be just right.

Like any successful arcade effort, *ROLLO* is difficult but learnable. Though there are three levels, the entry speed contains sufficient challenge to keep the new player coming back for more. And, as you get better at painting those squares and dodging those brushes, the game becomes more and more challenging.

ROLLO constitutes Windmill Software's fourth solid product for the PC. The company has already brought forth *Styx*, *Digger*, and *Conquest*: clones of the arcade favorites, *Qyx*, *Dig-Dug*, and *Joust*, respectively. This one, though, is a more-or-less original effort, although it borrows its "turn the tables" offense from *Pac-Man*, its frenetic chase from *Digger*, and its coloring-book goal from *Styx*.

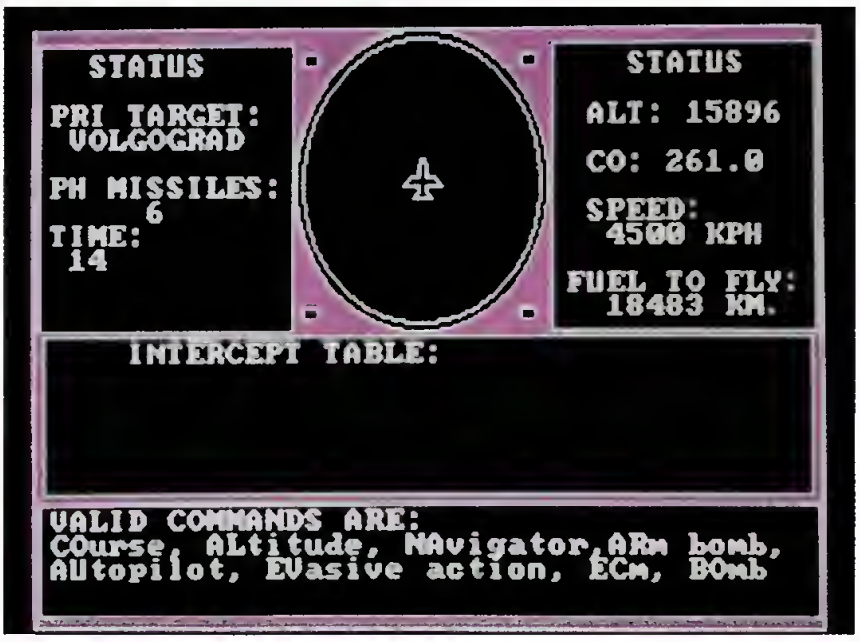
Once again, we award a high score after tilting at Windmill's latest. On *PC*'s scoring range from one to six, *ROLLO* paints a pretty picture:

FUN:	4.5
CHALLENGE:	4.5
COLOR/GRAPHICS:	5
TOTAL:	14

B-1 Nuclear Bomber
Microcomputer Games, Inc.
The Avalon Hill Game Company
4517 Harford Rd.
Baltimore, MD 21214
(301) 254-5300
List price: $21
Requires: 48K RAM, BASICA, color/graphics adapter.

CIRCLE 796 ON READER SERVICE CARD

Yes, folks, from Avalon Hill, the people who brought us VC, the Vietnam War



The view from the cockpit of *B-1 Nuclear Bomber*.

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PC ARCADE

computer board game, comes another exercise in exaltation of man's greatest effort: *B-1 Nuclear Bomber*. Although completely without redeeming social value, if *B-1 Nuclear Bomber* weren't so frightening, it *might* have been funny.

Read this and weep: "7 July 1991. You are the commander of a B-1 supersonic bomber flying a routine deterrence mission over Thule Air Force Base, Greenland. The radio man reports receiving a top-priority coded message from the Airborne Command Post: 'War Plan Alpha-5. This is not a drill.'

"You swallow hard, trying not to think of your wife and children, sleeping at this moment in their comfortable suburban Maryland home near Washington, D.C. There are no safe areas in nuclear war.

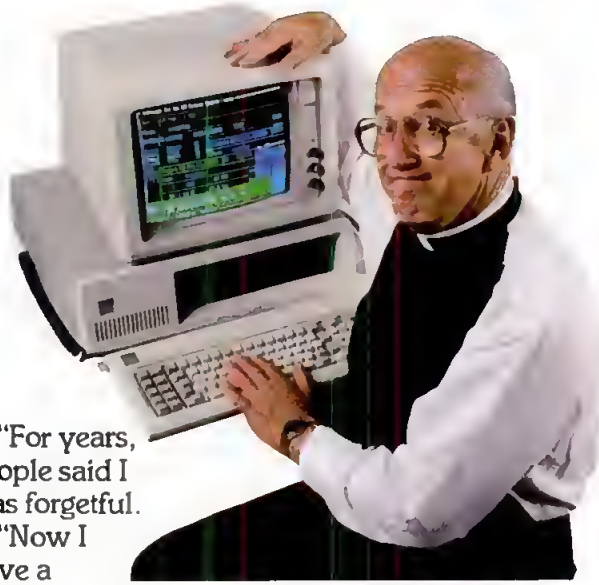
"You get a course to Moscow from the navigator, turn the nose of your B-1 toward the U.S.S.R., and prepare to carry out your mission. Perhaps, if your family is lucky, they will die quickly in their sleep. Meanwhile, your job is to make sure that aggression is punished. The politicians will have to try to pick up the pieces later, if any. . . ."

I shall attempt to keep my personal political and moral outrage to a minimum and concentrate instead on the worthiness of this product as a game. In a word: pitiful. The graphics are minimal, the sound effects are limited to annoying beeps, and the amount of thinking and reflexes demanded of the player is minuscule. Not that it gives me much comfort, but the designers have also assumed a tremendous amount of American military superiority: All it takes to get a MIG-25 off your tail is to type in "EC" for Electronic Countermeasures. My only problem was that I missed the display of the secret 5-letter fail-safe code at the start of my mission, and, after I had (yawn) navigated my B-1 bomber to target Yerevan near the Turkish border, I was unable to successfully Drop the Big One.

I hadn't the slightest interest in trying again.

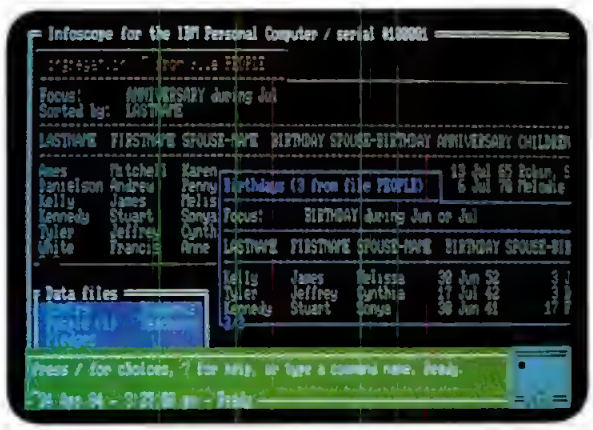
Like all of the Avalon Hill games

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CIRCLE 326 ON READER SERVICE CARD

reviewed in this column, this one appears to be an assembly line make-over of a TRS-80, Atari, Commodore, Apple, or Timex/Sinclair product. This product makes no effort to take advantage of the IBM PC's special features, and no effort was made to update the title and theme of this 1980-vintage game: the B-1 bomber project was a Pentagon pipe dream that has faced numerous delays and challenges from Congress.

Unfortunately, Avalon Hill's *B-1 Nuclear Bomber* game is already in production and can't be proscribed by Presidential fiat or Congressional resolution. On *PC*'s rating scale from a low of one to a high of six, this product is a nuclear fizzle:

FUN:	2
CHALLENGE:	1
COLOR/GRAPHICS:	1.5
TOTAL:	4.5

Computer Football Strategy
Microcomputer Games, Inc.
The Avalon Hill Game Company
4517 Harford Rd.
Baltimore, MD 21214
(301) 254-5300
List price: $21
Requires: 64K RAM, BASICA.

CIRCLE 797 ON READER SERVICE CARD

Moving on to football, Avalon Hill presents another bomb. Though the designers make a pretense of offering a true computer simulation of football, the "game" is merely a boring substitution of the computer's random number generator for a set of dice. Once again, Avalon Hill shows no feel for the PC.

Computer Football Strategy possesses *no* sound effects, and the screen image is white on black, using only standard ASCII characters.

I imagine some of the regular readers of this column must be getting as tired of reading about Avalon Hill's limp offerings as I am of reviewing them. I keep hoping that this 25-year-old company with its fine reputation for board games will one day realize that while computers are a different, capable medium for games, they demand special attention.

Computer Football Strategy is minor league:

FUN:	2.5
CHALLENGE:	2
COLOR/GRAPHICS:	0
TOTAL:	4.5

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CIRCLE 319 ON READER SERVICE CARD

The Reference Shelf: Where to Turn

When you need to know what to buy, what to read, where to go, or whom to ask, here are some computer reference books you can count on to point you in the right direction.

Apart from the technical manuals that hackers dote on, the computer reference bookshelf breaks naturally into several distinct categories: Which computer/program/book should I buy, where can I find out what I need to know, and what in heck does that mean? Here are a few specimens.

The Reader's Guide to Microcomputer Books
Michael Nicita and Ronald Petrusha
Brooklyn, New York: Golden-Lee Book Co.
420 pages, paperback, $9.95
ISBN: 0-912331-00-3

A book may be the cheapest insurance you can buy to help you obtain the full value from your investment in a microcomputer—but only if it's the right book. *The Reader's Guide* goes a long way toward eliminating the guesswork involved in purchasing "bookware." Of course, there's no substitute for actually thumbing through a book to see whether it covers all you want to know. But the 351 evaluations of 406 titles presented here can direct you to the better efforts first and give you sufficient context to compare several books covering the same topic.

While only one-fifth of the books published last year are included, they represent the full spectrum of computer titles, from general introductions to language-, program-, operating system-, and computer-specific tutorials, and from beginning texts to advanced references. The reviews are mostly 250 to 350 words long and stick



strictly to the matter at hand, ticking off each book's contents and merits with cogency and economy. In addition to the description and publishing information, the authors assess each book's level of difficulty.

The evaluation itself is quantified into a rating from 10 to 100. For books I was already familiar with, I found the ratings reliable and consistent if somewhat skewed towards the high end. But this grade inflation may appear worse than it is, since few real lemons are included among the books reviewed.

Book and computer store managers in particular will appreciate the care and labor that went into this guide's preparation and will be able to follow its precepts when stocking their shelves.

Excerpt: *We all know that peculiar species of world traveler whose ability to communicate in a foreign language is limited only by his ability to shout in English. Unfortunately, we do not all know his computer-book equivalent: the author whose ability to clearly relate complex ideas is limited only by his ability to truncate sentences and strip language of all words remotely polysyllabic. Sentences stay short. Words stay simple. See John's computer run.*

"Computers are like small children," write [the authors]. And only a businessperson with a lemonade-stand mentality would seriously consider buying this book, we add.

The Addison-Wesley Book of IBM Software, 1984
Edited by Robert P. Wells, Sandra Rochowansky, and Michael F. Mellin.
Los Angeles: The Book Company.
442 pages, paperback, $19.95
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The HX-12 has the highest resolution (690x240) and the finest dot pitch (.31mm) in its class. And yet its suggested retail price is comparable to many medium resolution monitors. The HX-12 brings no-compromise color to the PC and now, with the PGS RGB-80 board, to the Apple IIe as well. **Suggested retail price: $695.**

The new SR-12, in conjunction with the PGS high performance color graphics card, also features a .31mm dot pitch supporting 690 horizontal resolution. However, by increasing the horizontal scan rate to 27.5 KHz, the SR-12 can support 400 vertical resolution in non-interlaced mode. This results in a very high quality, flickerless image with the ability to generate graphics and text that is truly of monochrome quality. **Suggested retail price: $799.**

The new MAX-12 offers you easy-on-the-eyes amber with 720x350 resolution at a suggested retail price ($249) that is actually lower than the leading green-on-black competitor. And the MAX-12 runs off the IBM PC monochrome card—no special card is required.

Clarity of the Max 12 is enhanced by dynamic focusing circuitry which ensures sharpness not only in the center but also in the edges and corners. **Suggested retail price: $249.**

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CIRCLE 299 ON READER SERVICE CARD

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BOOK REVIEW

Apart from the myopia of a title that equates PC with IBM, this book delivers on more book-jacket promises than any other I've seen. I'd call it the best review book there is—if I didn't know that there are a few creeping around that I haven't read.

The book contains long, detailed, readable discussions of 293 programs and 65 games that run on the IBM PC (and on compatible machines or under MS-DOS). Business, word processing, spreadsheet, database management, graphics, educational, utilities, and personal programs are included, with a comprehensiveness that would be numbing if hundreds or thousands of dollars weren't riding on the effort. The kind of pressure that the crowded marketplace puts on my pocketbook makes me welcome such conscientiousness.

The reviews, which average a thousand words in length, rate documentation, vendor support, error handling, ease of use, reliability, visual appeal, and the value received relative to the cost. Utilities are also rated on their usefulness and educational programs on their educational value. The ratings take the form of grades from A to F with pluses and minuses, and an overall rating is calculated for each product via some unspecified formula. The games, of course, are rated by other pertinent factors and are given much briefer reviews.

While the grading seems to be fairly consistent throughout, it may be a bit too lenient: Of the more than 3,000 grades issued by the 58 reviewers, there are fewer than ten Fs.

While this collection of evaluations is more comprehensive and useful than other compilations, clearly it does not describe every PC program. Peter McWilliams' *Word Processing on the IBM*, identifies 56 word processing programs that will run on the PC; here only 25 are evaluated. These 25 span the market, but among the 31 missing programs are Microsoft *Word*, *Perfect Writer*, and *Muse*. Presumably such omissions will be addressed in the updates that will pop up between the planned annual revisions of this book.

1984 Microcomputer Market Place: A Comprehensive Directory of the Microcomputer Industry
New York: Dekotek, Inc.,
517 pages, paperback, $75.00
ISBN: 0-911255-01-X

The prototype for this reference book is R.R. Bowker's *Literary Market Place*

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Word Processing on the IBM
Peter A. McWilliams
Los Angeles: Prelude Press (distributed by Ballantine Books, New York).
287 pages. Paperback, $9.95
ISBN: 345-31530-8

The cover of this book offers this accurate self-description: "A special edition of *The Word Processing Book* for owners and prospective owners of the IBM Personal Computer." Had McWilliams been able to individually review the 56 word processing programs whose features he contrasts, or even a significant subset, this would be a rare treasure indeed.

Online Database Search Services Directory
Edited by John Schmittroth, Jr., and Doris Morris Maxfield
Detroit: Gale Research Co.
574 pages. Subscription to two parts (part 2 will appear in August 1984), $75.00
ISBN: 0-8103-1698-6

Descriptions of databases and on-line already exist, such as Cuadra Associates' *Directory of Online Databases* and Gale's own *Encyclopedia of Information Systems and Services*. This new directory goes one step further and lists those organizations, such as libraries and public information firms, that will access databases and conduct information searches for members of the general public, usually for a fee.

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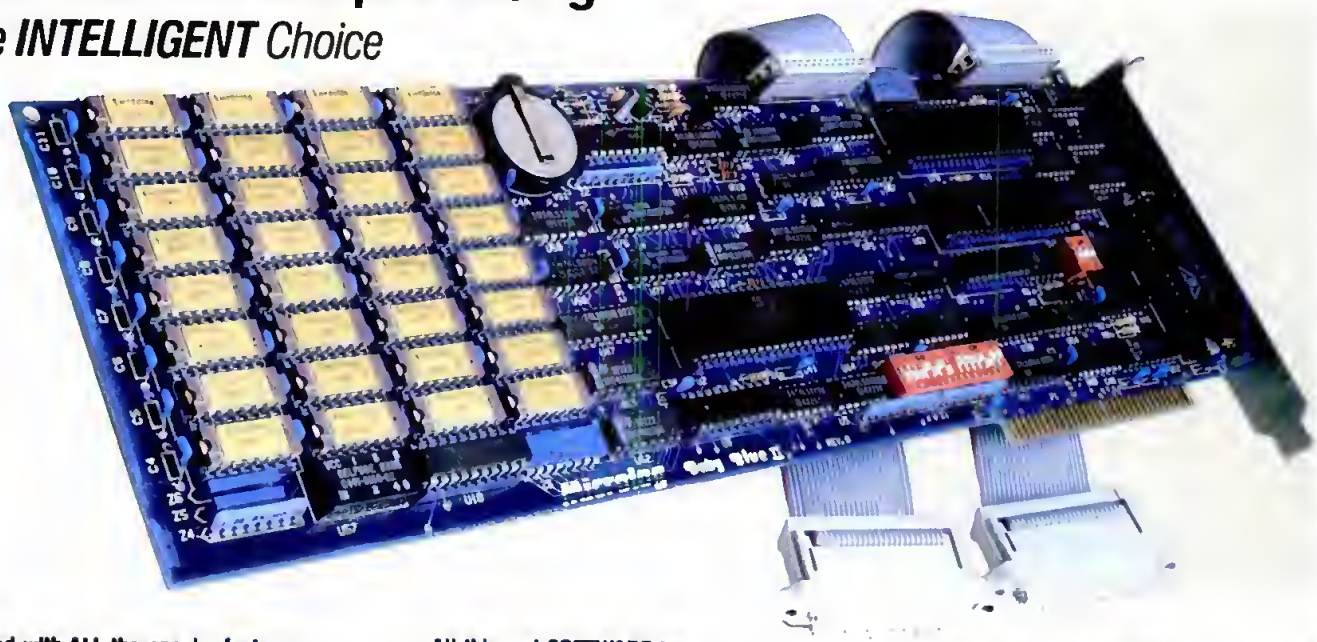
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  Baby Blue II offers instant access to the vast CP/M-80 library of mature, professional software for every conceivable application.
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Balancing Act

Earnings on account balances are a large source of profits for banks, but are subject to changes in interest rates. A PC and a spreadsheet can help find the proper minimum balances.

Providing services such as money transfers, letters of credit, and foreign exchange creates a thorny planning problem for commercial bankers. They not only must make a profit on these services, but must also remain competitive. What makes it so difficult is that banks generally do not directly charge commercial, industrial, and institutional customers for these types of services. Instead, customers are required to maintain minimum balances in demand deposit accounts, and the earnings on these balances are used to pay for the services provided. The income left over becomes a large and essential source of profit.

Unfortunately, the amount of income earned by these balances, and thus the amount of the bank's profit, depends on variable interest rates that are beyond the bank's control. Moreover, the bank cannot continually change minimum balance requirements every time interest rates change. The requirements must remain relatively constant, and customers must be given ample warning of any changes. An accurate planning model is one way to make order out of this chaos and ensure that a bank's compensating balances—and its profits—remain at the proper level: a perfect challenge for a PC and an electronic spreadsheet such as *1-2-3*.

A successful business forecast must indicate how possible future events will



affect the business. This is the classic "what-if" simulation. I have used *1-2-3* to create a prototype of a hypothetical business plan for a commercial bank (see Figure 1). The plan focuses on the interaction of interest rates, service volume, and minimum balances, since this is the most volatile and hard to predict area of a bank's profitability. Although conceptually simple, this model-in-progress is a powerful tool for analyzing these interactions, and it effectively demonstrates the uses of microcomputers in business planning.

Column A in Figure 1 shows typical business plan categories for a commercial banking division. (The types of loans, services, and expense categories were limited to keep the worksheet readable.) Column B contains the entry as it appears on the screen, and Column C indicates the formula or data that would be inserted into the corresponding cell in Column B.

The rate assumptions in Rows 4, 5, and 6 are at the heart of the simulation. They will have the major impact on the bottom line. The "Prime Rate" (Row 4) is the basis for some lending rates to commercial customers. Many loans are tied to the prime rate. The "Marginal Funds Rate" is the rate the bank will have to pay for funds it lends. The "External Funds Rate" is another pricing rate.

The loan volumes in Rows 9, 10, and 11 represent the projected category totals that the division expects for the year. (These three categories were chosen for the prototype because together they make up the lion's share of bank loan income.) The numbers in these rows are negotiated by the lending officers (who are responsible for generating the business) and senior management (who want to expand the volume of business). The numbers are likely to be changed many times.

Service volumes in Rows 14–17 represent the number of money transfers, letters of credit, account services items, and so on that the division expects its customers to use. Like the loan volumes, these numbers are projections that will go through many iterations; they are formed by com-

Illustration: Michael Ng

bining extrapolations from the previous year, senior management's growth goals, and other influences.

The income categories are found in Rows 20–22 for loans and Rows 23–26 for services. Each loan category is the product of the loan volume for that category and a particular interest-rate spread. On fixed-rate loans (Row 20) this is the spread between the fixed rate the bank gets and the bank's current cost for funds, that is, the Marginal Funds Rate (B5). The income on floating-rate loans (Row 21) is the spread between the Prime Rate it charges (B4) and the Marginal Funds Rate. Finally, the income on matched-fund loans (Row 22) is the spread between an average outside rate it charges, the External Funds Rate (B6), and the Marginal Funds Rate.

The income from each of the services shown is the product of the respective service volumes (shown in Rows 14–17, Column B) and unit prices, Column D in Rows 14–17.

Balances

The next group of items, Balances, is crucial for *real* (as opposed to *theoretical*) profitability. Since most loans are automatically tied to changing interest rates, loan income depends primarily on volume, but covering the expense of providing bank services depends on a combination of balances (minus the 16.5-percent reserve that regulations require banks to keep on deposit) and the return the bank can earn on these funds.

The formula for calculating required balances for each service, which appears in Rows 31–34, is arrived at as follows: The yearly revenue from balances is the external funds rate times the balances reduced by the amount of the reserve requirement, or (1 – reserve requirement) × balances. (Note that these services are merely a random sample of services banks perform.) Solving for the balances results in the formula.

If interest rates decline, then larger balances are required to pay for the same amount of services. For example, if the amount that has to be earned on the compensating balances is $100 and the interest rate is 10 percent, a balance of $1,000 will earn that $100. If the rate drops to 5 percent, a balance of $2,000 would be required to produce the same $100.

In bank business planning, therefore, it is important to be able to quickly see not only the impact of a change in interest rates on loan income, but also on the level of customer balances required to pay for the services the customer is using.

When interest rates fall, bank management must ensure that customers paying for services with compensating balances sufficiently augment their demand deposit balances. Using a planning model such as this one enables the manager to project not only what loan income is obtainable but also what level of minimum balances are likely to be required under varying interest rate conditions. Using the model as a monitoring tool will alert line managers to the need for new minimum balances during periods of falling interest rates. ■

	A	B	C	D	E	F
1	BANKING DIVISION BUDGET					
2						
3	Rate Assumptions:				Reserve Reqt:	
4	Prime Rate	12.00	12.00		0.165	
5	Marginal Funds Rate	11.50	11.50			
6	External Funds Rate	11.57	11.57			
7						
8	Loan Volumes:					
9	Fixed Rate Loan Volume	50	50			
10	Floating Rate Loan Volume	2200	2200			
11	Matched Funded Loan Volum	2600	2600			
12						
13	Service Volumes:				Prices:	
14	for Acct Services	100	100		50.00	
15	for Money Transfer	700	3000		4.50	
16	for Cash Management	200	200		2.40	
17	for Letter of Credit	50	50		10.00	
18						
19	Income:					
20	Nil fixed rate(9.00)loans	-100.0	+B9*(9.5-B5)			
21	Nil floating rate loans	1100.0	+B10*(B4-B5)			
22	Nil matched funded loans	182.0	+B11*(B6-B5)			
23	Account Services	5000.0	+B14*E14			
24	Money Transfer	3150.0	+B15*E15			
25	Cash Management	480.0	+B16*E16			
26	Letters of Credit	500.0	+B17*E17			
27	TOTAL INCOME	10312.0	@SUM(B20..B26)			
28						
29	Balances:					
30	for Acct Services	69281.4	+B23/(1-B7)*B6			
31	for Money Transfer	36445.5	+B24/(1-B7)*B6			
32	for Cash Management	5553.6	+B25/(1-B7)*B6			
33	for Letter of Credit	5785.0	+B26/(1-B7)*B6			
35	Controllable Expenses:					
36	Salaries, Benefits	350.0	350.00			
37	Travel & Entertainment	35.0	35.00			
38	Supplies & Telephone	22.0	22.00			
39	Premises,Utilities,Depreс	18.0	18.00			
40	Operations Costs:				Unit Costs:	
41	for Acct Services	4500.0	+B15*E42		45.00	
42	for Money Transfer	3010.0	+B16*E43		4.30	
43	for Cash Management	400.0	+B17*E44		2.00	
44	for Letter of Credit	495.0	+B18*E45		9.90	
45	TOTAL EXPENSES	8830.0	@SUM(B37..B40)	+@SUM(B42..B45)		
46						
47	PROVISION FOR LOAN LOSSES	100.0	100.00			
48						
49	RESULTS BEFORE OVERHEAD					
50	AND TAXES	1382.0	+B27-B45-B47			

Figure 1: *An abbreviated example of a business plan for a commercial banking division.*

Hannah Blank is vice-president in charge of Management Information Systems at Chase Manhattan Bank. She has been working with computers for almost 20 years and is the author of Mastering Micros, *a how-to guide for business executives and managers.*



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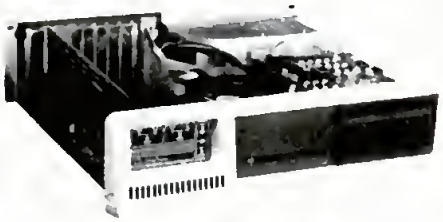
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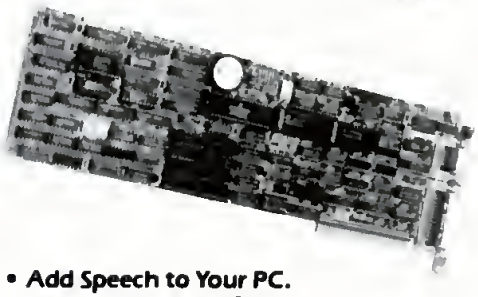


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For Crowded Courts: PC Spells Relief

The Third Judicial District in upstate New York has embarked on a pilot project to test how the PC can be used to help ease the load of paperwork burdening the court system.



Illustration: Philip Anderson

Confronted by escalating caseloads of criminal and civil litigation coupled with budgetary restrictions from fiscally strapped governments, judges and court administrators are in desperate need of relief. With no money to hire additional staff, New York State's sprawling Third Judicial District is experimenting with a less traditional form of workload relief—IBM PCs. A pilot project has already put three PCs in courthouses, and ten more are scheduled to come on-line by the end of 1984.

The district uses dual-drive PCs with 640K RAM, Zenith monochrome monitors, and Epson FX100 dot matrix printers. One PC is installed in Albany County Supreme Court, which handles major civil cases; one in Rensselaer County Family Court, which handles domestic and juvenile cases; and one in the district's central administrative office. The administrative installation also includes two dumb terminals: A Paradyne terminal transmits statistics to the state Office of Court Administration mainframe in New York City while an IBM terminal processes vouchers for payment through the state comptroller's mainframe in Albany.

New York's seven-county Third Judicial District is headquartered in Albany and runs along the state's eastern edge. Bordering on Vermont, Massachusetts, and Connecticut, it mixes urban, suburban, and rural areas. When all 13 PCs are in place, the project will be able to test their court-related applications in a variety of settings, ranging from high-volume municipal police and traffic courts through the county-level tribunals that handle the most serious criminal and civil cases.

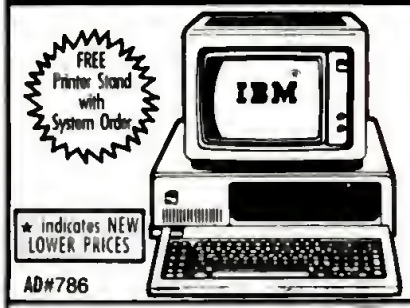
Order in the Courts

The PCs won't decide cases, of course. The aim is to use them to handle the mounting tide of paperwork that inevitably accompanies increasing court caseloads: scheduling, budgeting, case management, inventory control, database management, networking, report generation, word processing, and personnel.

Computerization is the logical alternative to hiring more staff, according to David Sullivan, executive assistant to District Administrative Judge Edward Conway. Gloria Beattie, the district's court analyst, said, "Because the Legislature did not authorize any new positions, we decided to go with the PCs and to use the staff we have." Sullivan explained, "We hope automation will give the clerical staff more time and give judges more discretion in managing their own caseloads. Obviously we have no control over our input. We can't tell someone not to file a lawsuit. We can't control the crime rate.

"We want to assist the courts and judges in case management," Sullivan contin-

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ued. For example, a case-management system could track all open cases, earmark those pending longer than judicial guidelines allow, and determine which attorneys are handling which lawsuits. That information will help locate problems, provide more flexibility to individual judges in scheduling their cases, and give the administrative judge "more flexibility in scheduling judges," Sullivan said.

The district's PCs are now being used to:

- Generate the myriad of reports required by the Office of Court Administration and other government agencies, including reports on changes in a criminal defendant's legal status, on bail payments in the court's safekeeping, and on the number and types of cases processed by each judge and court.
- Calendar cases for hearings and trials, a process previously done manually.
- Maintain personnel files on the district's 313 judges and nonjudicial staff. Those employment records contain civil service information, so personnel officers know when an employee with provisional status must be replaced by someone from a competitive examination list.
- Schedule the district's 15 Supreme Court stenographers who record and transcribe court proceedings.
- Inventory $20,000 to $30,000 worth of centrally purchased supplies annually. The system monitors orders and distributions, then allocates the costs to the appropriate court's budget.
- Process the approximately 7,000 vouchers that are paid each year.

Looking Ahead

The district has not yet fully tapped the PC's capabilities for court management and operations. Sullivan plans to network the micros and develop a tracking system



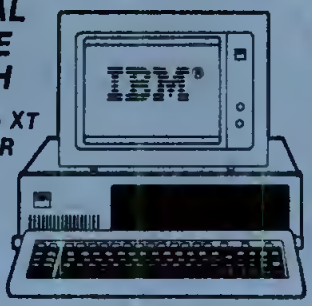
David Sullivan and Gloria Beattie working at one of the Third Judicial District's PCs.

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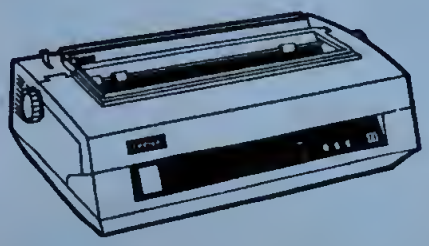
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so the status of any of the district's thousands of pending cases can instantly be checked. Another possibility is to connect dumb terminals to PCs in the busiest Family Courts to speed data entry. PCs could also interface with the state's mainframes, avoiding the need to enter some data, such as voucher information, twice.

According to Sullivan, one PC also may be used for financial analysis, such as monitoring spending to ensure that each court stays within its appropriations. A spreadsheet program could be used to develop future budget proposals.

Presently there are no plans to install a PC in each judge's chambers, although that remains a possibility, Sullivan said. However, the district does intend to experiment with using word processing software to generate routine correspondence and to prepare judicial opinions.

There are no plans to install a PC in each judge's chambers.

The first three PCs arrived bundled with *VisiCalc* and *PFS:FILE*, but the district's software needs have already evolved, Beattie and Sullivan explained. "We have graduated to more sophisticated software," Sullivan said. Lotus' *1-2-3* is now the district's spreadsheet of choice, while *Advanced DB Master* is the preferred database management package. According to Beattie, *Advanced DB Master* requires "a bit more training on first exposure, but it will do almost anything you want. It's amazing what that program will do." She particularly liked its capacity to program its dedicated function keys as macro keys, speeding the preparation of reports.

The ten new PCs will be scattered throughout the district, primarily in the busiest Supreme, County (felony), Family, and Police Courts. One is also scheduled for the courthouse in rural Greene County in the northern Catskills, where a single judge presides over Family, Surrogate's (probate), and County Courts.

"There are many other smaller courts where a PC would be feasible," said Sullivan, "but first we want to evaluate the first generation." ■



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Prentice-Hall, Inc., the international publishing company, is one of several large professional and textbook houses to begin packaging software with its books. I received one of its first fruits, *Science and Engineering Programs for the IBM PC*. This paperback has a sleeve inside the back cover into which the floppy disk fits; I was truly impressed by Prentice-Hall's packaging solution. Voila! The marriage of books and electronics is complete. The book, I presume, will be sold from the shelves in bookstores, just like any potboiler spy story, and can be shipped and received just like any other book.

What this method of packaging does for the long-term health of the floppy disk in the sleeve is another question. I can't help but think, given the dog-eared appearance of even my newer paperbacks, that Prentice-Hall and other publishers should consider putting the disk in the middle of the book, protected in a sturdier sleeve. The added expense of this packaging would be worthwhile.



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The Book

Scientific and Engineering Programs, which is also sold without the disk for $12.95, was written by Cass Lewart, who describes himself as a research engineer in communications and computer science at the System Development Company, in West Long Branch, New Jersey. Both his bibliography and the cover blurb indicate that he is a frequent contributor to such trade magazines as *Computer Design*, *Electronics*, and *Computers and Electronics*. Indeed, four of the programs in the book are drawn from his previous magazine articles.

According to the author, the 19 programs making up this book are designed for the electronics and communications engineer, programmer, college student, and advanced electronic hobbyist. They include graphics generation, number theory, a sprinkling of applied mathematics, probability and statistics, electrical engineering, operations research, and two "miscellaneous" programs called "Azimuth and Elevation for Geosynchronous Satellites" and "Artificial Intelligence Strategy Game." The inclusion of the geosynchronous satellite program struck me as bizarre at first—how many of us have a satellite sitting around, waiting to be shot up by NASA? When I read more closely, however, I found that the program dealt with aiming a private television receiving antenna at an orbiting satellite. A nice touch, if you want to get your cable TV for free, is the inclusion of the longitudes of 12 satellites now hovering over the United States.

The artificial intelligence program is sort of an AI sampler: The program "learns" your strategy in predicting heads or tails in a coin-toss game, and if it matches your guesses, it wins. If your guesses are random, so are its; if you use a strategy, it learns to mimic you.

All of the programs come on one dou-

Illustration: Michael Ng

ble-sided, double-density disk, written for the IBM PC and its compatibles. Both MS-DOS (either 1.1 or 2.0) and BASICA must be booted up before you can use the disk. The author recommends copying MS-DOS and BASICA onto a blank disk, then copying his programs onto that disk. Some of the programs call up other programs on the disk, especially the graphics generator. According to Lewart, if the full capabilities of the graphics generator are to be used, you must have a graphics adapter card.

Here are some of the other programs in the book:

• **Graph Display Routine.** This program, one of the longest (150 lines of BASIC commands) in the book, allows you to construct *x-y* graphs of a group of numbers in either low (320×200 pixels) or high (640 × 200 pixels) resolution. A helpful feature is that the program automatically scales the axes to give you the best representation of the data.

• **Fourier Coefficients of Periodic Functions.** Fourier transformations are functions of great value to scientists and engineers involved in analyzing complex sets of data. The program allows you to enter the formula to which you want Fourier analysis applied and then to graph the results. You specify the number of iterations the program should run.

• **Complex Arithmetic.** With this program, your PC is transformed into a calculator using the "reverse Polish notation" that we all know and love from the days when Hewlett-Packard hand calculators were the engineers' status symbol. RPN, for the uninitiated, uses a "stack" of registers that allow you to carry out mathematical operations and automatically store the result in another register. The routine can be used to analyze complex numbers (those with a real and an imaginary component). The program sets up six registers in the PC and allows you to perform 18 functions with the registers, including square roots or squares, arithmetic, and register-shuffling or register-clearing functions. All six stacks are continuously displayed on the PC screen—a useful way of keeping track of just what is where.

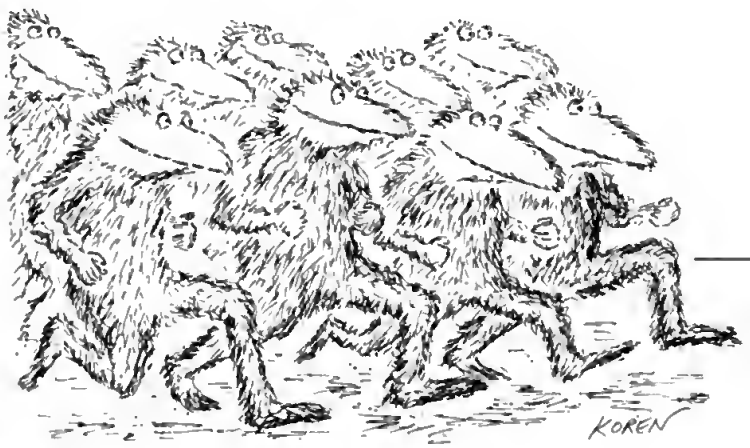
• **Curve Smoothing and Interpolation/Extrapolation.** Data-gathering researchers are often faced with a mass of numbers that apparently have no pattern, but must nevertheless show some pattern (otherwise, why was the experiment run?). A variety of methods have been devised to smooth the numbers into a nice curve on a graph. This routine uses one such method,

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"This program is impressive—it's easy to use, simple, logical, and powerful and comes with flawless written documentation."
Giovanni Perrone, InfoWorld, March 12, 1984



the Lagrange polynomial, to draw a smooth line through all the data points. Once you have done this, you can then interpolate between data points with at least a little confidence. The program takes the data points, graphs the plot line, and displays both the original points and the plot line.

In addition to these programs, the book contains others that compute resonant electric circuits, solve queuing equations, test the reliability of systems such as office electronic equipment, and more. In each case, the author presents some background on the program, lists a sample run of the program output, and gives the code for the program itself. Lewart's programs are obviously well thought out and explained; he even explains the limitations of some of the routines. Also included in the documentation is an appendix of programming tips and an index, in which I found one omission.

Why Not the Best?

I have some reservations about this package—mainly about who would buy it, and why. Most of the programs are either elementary (such as the resonant electric circuit program—I can remember doing homework problems on this subject in freshman physics) or so advanced that the person who would use it probably has it already.

Moreover, I wonder about how the author and publisher selected these 19 programs to put in one book. It has nothing on economics, even though this topic is an essential component of much engineering work. The statistics packages—combinations, permutations and factorials, and binomial and hypergeometric distributions—strike me as rather mundane. Nor does it have any programs for such typical scientific analytical processes as linear algebra and matrix functions, regression analysis, vector analysis chi-squares, PERT project schedules, and so on. Most of the standard reference works for scientists and engineers that I know of cover these analyses.

I am aware, of course, that many other commercial software offerings remedy these omissions. Some of them cost a pretty penny, too, so I suppose I should be asking: What do you want for $29.95? On the other hand, if you are an electronics researcher who needs to graph complex numbers over a smooth curve for a geosynchronous satellite containing a resonant electrical circuit with artificial intelligence capabilities, this is the perfect book for you. ■

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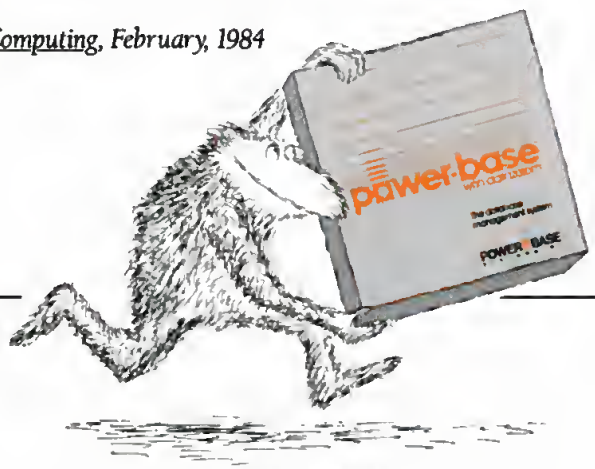
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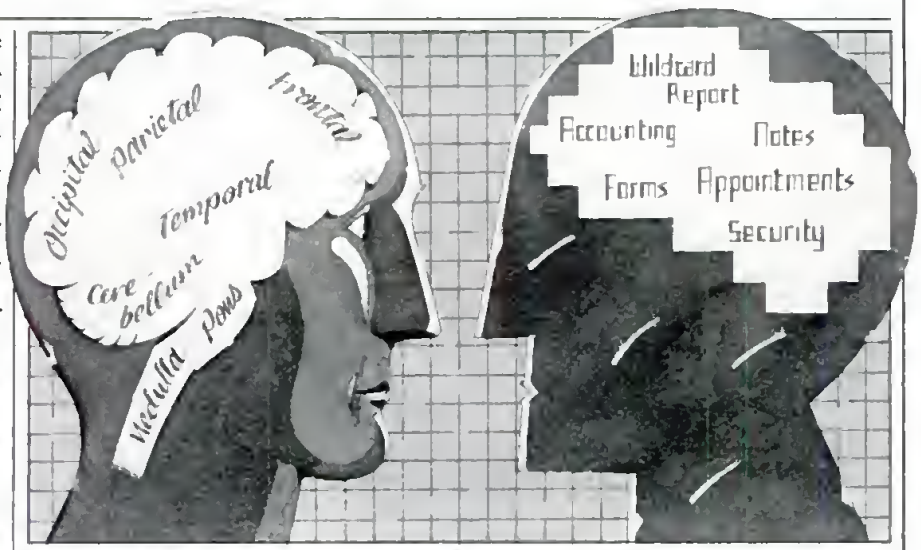
The complete medical management system isn't really complete without a few extra touches. You may not need all these extra features, but they make your work a little easier.

The essential components of the medical office management package are appropriate hardware and a sophisticated billing and accounting system. But few computer users are satisfied with the bare essentials. Most software developers are aware of this, and they often add enticing bells and whistles before they've even optimized the program's basic functions. These extras are of variable value, so reading up on their usefulness before you buy might save you from costly mistakes.

What follows is actually a wish list. Not all of the features mentioned are available on the PC yet, although they might be available on other computers. They should all be on the market soon, though.

Most programs can be customized to the extent of letting them know what printer you're using and how many drives your machine has. Some manufacturers, however, have designed software that you can truly tailor to your own needs. You can reassign the function keys or create keyboard macros that let you execute complex operations with a single keystroke.

More flexible programs let you add tax or interest to your patients' accounts or specify the wording of a gently threatening notice you want printed on your overdue bills. The ideal program would give you lots of room to be imaginative—while giving you guidance so that your imagination doesn't take you too far afield.



Security

Most programs allow you to specify a password without which the program won't start, but that may not be enough. Your patients ledgers and accounts receivable records are important and private. You probably don't want the temporary secretary who occasionally types office notes on your computer to be able to alter your financial records. Some of the more sophisticated packages will allow you to create a map of password hierarchies that will admit those who hold high-level codes into all parts of the system while restricting those with lower-level codes to less sensitive areas. These schemes can be quite involved. For example, a program might ask the user's name, and then, when a valid response is entered, ask for a password specific to that person.

Forms

You'll probably want to place billing information on several different forms to conform to Medicare, Medicaid, Blue Shield, and other third-party specifications. You may also want a separate form for patient billing and account summaries.

One method designers use to deal with the wide variety of formats users need is to let you decide for yourself how the printed paper should look, using a line and space map. Creative users can have a field day, while others can just copy the paper forms they've been using. Sample forms are sel-

Illustration: Phil Anderson

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dom exactly what you need, but designing forms—enjoyable as it may sound—is a tedious process; you may be glad those canned forms are there.

Aside from billing forms, you may want your system to prepare a variety of other useful printed items. A hospital rounds sheet listing patients who are currently hospitalized and their location, diagnosis, and dates of admission and discharge can be valuable if you visit several different hospitals. An encounter form that contains the patient's name, the date, and a list of procedures that you can check off as you examine the patient can be useful for billing in the office. A recall notice generated by the machine and mailed a few days before the patient's appointment can reduce no-shows. Finally, you can have a bank deposit slip printed based on the transactions of the day.

Appointment Calendar

The value of an electronic appointment calendar is often debated. It's certainly useful if you'd like to print recall notices or daily office schedules, but the old-fashioned desk book is reliable and doesn't tie up a terminal. If you've got fewer than five schedules to follow, the desk book is faster than the computer, too.

But if you've got several offices scheduling you concurrently—or more than six schedules to keep straight—an electronic system that is immediately accessible to all your staff can be a great help.

Integration

A real wish-list item is a medical management system that would let you integrate the additional software of your choice. For instance, many medical systems claim the ability to keep clinical notes on-line, but often they allow only one page per patient. You can keep a medicine list here or your initial history and physical exam, but you'll have a hard time fitting much more into the limited space. If you keep copious notes, a good word processor would be useful to you. Though we all have our favorite word processors (mine are *WordStar*, *MultiMate*, and *Word Perfect*), you're stuck with the one provided by the medical management software.

You may occasionally find a medical program that includes general-ledger capabilities such as accounts payable, payroll maintenance, and check writing. But if the program you've chosen is weak in this area, you're stuck again. You can't buy a general accounting program and integrate it into your system.

What else can you ask for? Electronic billing, for one thing. If the third-party payors in your area have enough demand, they'll gear up to allow you to send your billing on disk or by phone to their computers. With this method there are fewer errors in typing, the cost of processing is lower, and the turnaround time is faster than conventional methods.

Access by telephone to a medical database is another useful extra. A wealth of information is available in the National Library of Medicine and other databases. If you or a covering physician has a portable computer, you might also like to have access to your patients' chart notes after hours by phone. Perhaps even more useful would be access to information related to your patients that is stored in the hospital's computer: lab data, chart notes, medicines used on the last admission, emergency room notes, and X-ray reports.

Having It All

If some of these extra features appeal to you, you'll probably be able to find them with careful shopping, especially if you can wait a while. But what if you like them all—can you have everything? Unfortunately, it's unlikely that any one medical management program will offer all the bells and whistles I've discussed. The ideal would be a flexible medical program that you could customize for your own needs and into which you could integrate your favorite word processing, general-ledger, and communications programs. From there, the rest is up to you. ■

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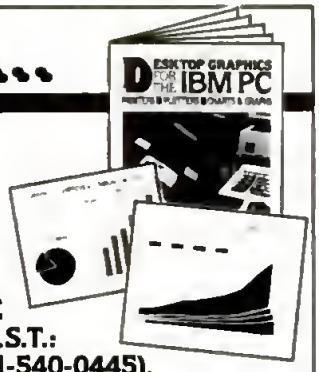
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New On The Market

HARDWARE

Cygnet CoSystem

A voice and data communications system designed to operate independently or in conjunction with the user's system. Incorporating a microprocessor, the CoSystem can handle simultaneous voice and data teleconferencing over normal phone lines, with smart modem features such as autodialing/redialing. Other features of the device include programmable function keys, automation of special PBX calling functions, automatic database/electronic mail system accessing, terminal emulation, and the ability to record details of all communications activities.

Versions of the Cygnet CoSystem unit are available for 300- or 1200-baud communications. An add-on speakerphone option is also available.

(List Price: 300-baud $1495; 1200-baud $1,845)
Cygnet Technologies, Inc.
1296 Lawrence Sta. Rd.
Sunnyvale, CA 94089
(408) 734-9946

CIRCLE 782 ON READER SERVICE CARD



Cygnet CoSystem, Cygnet Technologies, Inc.

Microfloppy Disk Drives

Two 3.25-inch disk drives using a standard 5.25 interface, offering storage capacities of 500 kilobytes or 1 megabyte per diskette. The MPI Model 321 (single-sided, 500 kilobyte capacity), and the MPI Model 322 (double-sided, 1 megabyte capacity) drives use flexible-jacket microdiskettes, with fewer moving parts than the semi-rigid 3.25 disks. The drives feature a track-to-track access time of 6 milliseconds, with 140 tracks per double-sided disk.

The MPI microdiskette drives are plug-compatible with standard double-sided IBM PC 5.25-inch drives. The media's format—80 tracks per side—allows the user to download double-sided 5.25-inch software to the microfloppy drives' diskettes without modifications.

(List Price: Model 321 $189; Model 322 $290)
MPI
9754 Deering Ave.
Chatsworth, CA 91311
(213) 709-4202

CIRCLE 781 ON READER SERVICE CARD

Intelligent Data Collector

A remote data collection device designed to store and transmit data to a PC over serial communication lines. The device can collect and edit data from punched badge cards and either transmit the data immediately to the host computer or store it in memory for later polling by a *Data Retrieval Program* also available from the manufacturer.

(List Price: Data Collector $2,995; Data Retrieval Program $25; set of 50 punched badges $97.50)
Requires: *Data Retrieval Program:* 128K RAM, one disk drive, PC-DOS, serial communication port.
Tech-S, Inc.
12997 Merriman Rd.
Livonia, MI 48150
(313) 425-9800

CIRCLE 790 ON READER SERVICE CARD

DataTalker II

An intelligent front-end processor that can emulate a range of remote batch and interactive IBM mainframe terminals under software control. The included software allows the user's system to emulate the IBM 3271 and 3275/76 interac-

tive terminals, and the 3780, 2780, 3741, 2968, and 2770 remote batch terminals in attended or unattended mode, using full IBM bisync protocol emulation. The device can operate under PC-DOS, CP/M-86, and Concurrent CP/M-86 operating systems.

The communications processor incorporates a Z-80A microprocessor, 64K RAM, shared memory buffering, dual ported memory, and two serial channels capable of synchronous or asynchronous communications through either port. Communication is at data rates of 1200 to 19,200 baud over Bell protocols 212, 201A, 201C, 208B, 209A, and other compatible modem protocols.

The DataTalker II connects to the RS-232 serial port of the user's system and includes software with an on-line trace facility for isolating line problems. The trace displays received data link control characters, transmitted messages, and command status transactions. A separate, off-line diagnostic program verifies the operation of the unit's real-time clock and serial port when the device is connected to a modem. All relevant modem handshaking lines are tested.
(List Price: $995)
Winterhalter, Inc.
3853 Research Park Dr.
Ann Arbor, MI 48104
(313) 682-8834

CIRCLE 783 ON READER SERVICE CARD



***DataTalker II**, Winterhalter, Inc.*

SOFTWARE

file search 3

A text file-management program employing simple file headers, unstructured key word entry/retrievals, and file searches with vague or incomplete data. With *file search 3*, the user can assign each file a header containing pertinent data and key words that identify the contents of the file. A "fill-in-the-blanks" screen handler guides the user in the entry of header information, including up to 150 key search words per text file or document.

Files can be retrieved by author, addressee, date, or one or more key words. Conditional expressions (AND, OR, and NOT) and multistage retrieval can be used to extend or limit searches, even with queries that are general or vague.
(List Price: $395)
Requires: 128K RAM, one disk drive, PC-DOS 2.0.
Data Technology Corp.
2775 Northwestern Pkwy.
Santa Clara, CA 95051
(408) 496-0434
TWX: 910-338-2044

CIRCLE 756 ON READER SERVICE CARD



***file search 3**, Data Technology Corp.*

Mail Order Pro

A mail order processing program that can process up to 500 orders per day. It produces mailing labels, VISA/MC/AMEX sales drafts, packing lists, back-order notices, and C.O.D. tags, while tracking current inventory and back orders.
(List Price: $695)
Requires: 128K RAM, two disk drives, PC-DOS 1.1, 132-col. printer.
Professional Publications
P.O. Box 199
San Carlos, CA 94070
(415) 593-9119

CIRCLE 766 ON READER SERVICE CARD

STRATA:G

A financial strategic planning program for retail executives. The software feeds departmental and combined open-to-buy data into a 12-month plan format consisting of cash flow, profit and loss, and balance sheet projections. In addition, it provides for retail management of gross margins, cash flows, banking requirements, working capital, critical ratios, balance, inventory planning, and trend analyses.

(List Price: $750)

Requires: 128K RAM, one disk drive, PC-DOS.

Retail Management Aids, Inc.
Skinner Bldg., #618-620
Seattle, WA 98101
(206) 623-3973

CIRCLE 763 ON READER SERVICE CARD

PLOT88

A FORTRAN graphics routine library, permitting the user to produce line graphics such as charts, graphs, and contour maps up to a size of 50 square feet. *PLOT88* provides pen plotter emulation on the IBM display screen, IBM or Epson printer, and the Tektronics 4025 terminal.

Included in the library of functions are AXIS, FACTOR, LINE, NEWPEN, NUMBER, PLOT, PLOTS, SCALE, SYMBOL, and WHERE routines.

PLOT88 allows the user to produce a drawing in its entirety or to divide it into sections. The software also includes the capability of mixing text in varying sizes and at any angle with the line graphics.

(List Price: $250)

Requires: 128K RAM, one disk drive, PC-DOS, MS-FORTRAN Compiler Ver. 3.1, graphics output device.

PLOTWORKS
P.O. Box 12385
La Jolla, CA 92037
(619) 457-5090

CIRCLE 784 ON READER SERVICE CARD

Jury Trial II

A courtroom strategy game. *Jury Trial II* features a cast of characters supported by individual dossiers in the accompanying documentation. Among the personalities introduced in this version are Mr. Wallbanger, the town drunk, and the voluptuous Linda LaVerne, a flirtatious nightclub dancer.

Players take on the dual role of prosecutor and defense attorney and attempt to "stack the jury" by choosing biased candidates. The outcome of the trial depends on the skillful tactics of the competing attorneys.

Case evidence is developed by interviewing the venerable county sheriff, who is uncooperative, impatient, and generally onerous to deal with. The computer acts as the judge, controlling the proceedings, ruling on objections, admitting evidence, and occasionally citing a witness for contempt of court.

After the case is tried and the jury decides on a verdict, the "judge" passes sentence. Appeals to a higher court are possible, but bail must be posted. A new case is assigned for every game.

(List Price: $49)

Requires: 64K RAM, one disk drive, PC-DOS.

Navic Software
Palm Beach, FL 33408
(305) 627-4132

CIRCLE 753 ON READER SERVICE CARD

ArabStar2

A multilingual word processing program utilizing several different foreign character sets, including the Arabic, Farsi, Urdu, and Malay alphabets. *ArabStar2* has integrated printing functions, including text transcriptions, block manipulations, and composition.

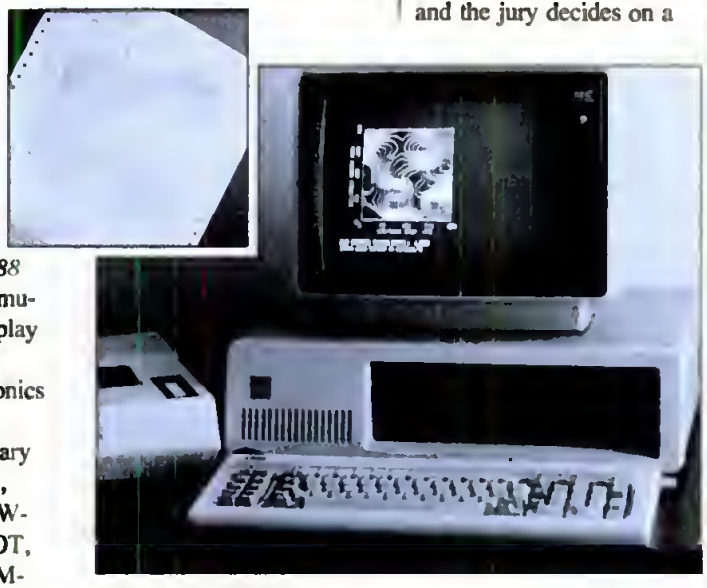
The word processing software can form text into a double-column format, with independent editing of each column. Maximum line widths of 132 characters are possible, with the screen acting as a window. All *ArabStar2* features are driven by menus.

(List Price: $900)

Requires: 128K RAM, one disk drive, PC-DOS.

Appropriate Technology Ltd.
c/o Summit CAD Corp.
5222 FM 1960 W 100
Houston, TX 77069
(713) 440-1468

CIRCLE 785 ON READER SERVICE CARD



PLOT88, PLOTWORKS



In-Search, Menlo Corp.

In-Search

A program providing access to, and rapid searching of, over 200 on-line databases maintained by Dialog Information Services Inc. *In-Search* connects to these databases through the user's modem; once connected, the software guides the user through data searches with on-screen graphics, extensive help commands, and built-in database descriptions.

Many search functions can be completed off line prior to connecting to the database, reducing connect time charges. Search strategies can be set up and the appropriate database chosen before actually making the call to Dialog. *In-Search* also eliminates the often time consuming task of manually entering the database's phone number, codes, and required passwords. Once the search strategy has been formulated, a single keystroke can automatically connect onto Dialog and start the search.
(List Price: $399)
Requires: 192K RAM, two 320K disk drives, PC-DOS.
Menlo Corp.
4633 Old Ironsides Dr.
#400
Santa Clara, CA 95050
(408) 986-0200

CIRCLE 792 ON READER SERVICE CARD

Docuwriter jr

A full-screen word processing program designed for the IBM-PC*jr*. The disk file output is directly compatible with other ASCII word processors, such as *WordStar*, permitting files created on the PC*jr* to be transferred to other systems for futher processing.

Docuwriter jr allows the creation of documents up to 130 columns wide using on-screen horizontal scrolling. All PC*jr* edit keys are supported for text insertion, deletion, and cursor control. Also provided are block moves, delete, and copy functions, and user-controlled search-and-replace. The system also includes word wrap and full text justification.
(List Price: $79.95)
Requires: PC*jr*: 128K RAM, one disk drive, PC-DOS 2.1.
CMA Micro Computer
55722 Santa Fe Trail
Yucca Valley, CA 92284
(619) 365-9718

CIRCLE 760 ON READER SERVICE CARD

VALUE/SCREEN

An investment analysis program, capable of sorting through thousands of stocks for those that meet up to nine user-selected criteria for investment. The program offers an array of 32 investment variables from which to choose those that meet the user's objectives. Variables offered include critical statistics, projections, and performance rankings.

VALUE/SCREEN is bundled with Value Line data disks, which list pertinent information for 1,650 stocks on a single diskette. Monthly updates for one year of the Value Line data disks are provided to users of *VALUE/SCREEN* as part of the software package.
(List Price: $495)
Requires: 64K RAM, one 320K drive, PC-DOS.
Value Line, Inc.
711 Third Ave.
New York, NY 10017
(212) 687-3965

CIRCLE 750 ON READER SERVICE CARD

Time Accountant

A time accounting/billing program permitting billing cycles and accounting periods of any length. Client, project, activity, and individual codes can consist of up to ten alphanumeric characters, as well as several punctuation characters.

The software includes a set of specially formatted calendar booklets in which the users enter appointments, activities, out-of-pocket expenses, and buy-outs. These data are transferred regularly to time sheets, from which the data, along with related codes, are stored in *Time Accountant* files. The software then performs all necessary calculations, generates needed reports, and bills active clients.

Time Accountant's capacity is limited only by the storage capacity of the user's system. Data entry fields are designed to screen out unacceptable entries. On-line help screens are available to assist operators, and the system displays cautionary messages concerning postings and other critical operations.

(List Price: $495)

Requires: 128K RAM, two 320K drives, PC DOS.

Software Quality Associates
636 Waverley St.
Palo Alto, CA 94301
(415) 327-3511

CIRCLE 787 ON READER SERVICE CARD



***Time Accountant**, Software Quality Associates*

Sorting System I

A tutorial program designed to demonstrate and teach the algorithms most commonly used for sorting, using color or monochrome graphics. The included sort routines may be run with a user's own programs and data. BASIC source code and description of the algorithms used is included with the accompanying manual.

(List Price: $45)

Requires: 64K, one disk drive, PC-DOS.

General Computing
145 Summit Dr.
Cedar Falls, IA 50613
(319) 277-7105

CIRCLE 762 ON READER SERVICE CARD

TTM II Market Analysis System

A technical analysis program for investment data. The user enters the daily closing prices of a stock index. Weekly, the number of new lows that have been reached on the New York Stock Exchange are also entered. From this data, *TTM II* produces daily intermediate term signals, recommendations to the user to either buy, sell, or do nothing with the stocks listed in the daily index. The accompanying manual describes how a variety of trading vehicles can be used to follow these daily signals.

In addition to examining, analyzing, and correcting old stock data, the software can also display graphs of its database, and can print out its own track record. Advanced users can change the parameters controlling buy and sell decisions to customize the system to different stock markets or even commodities markets.

The *TTM II* software includes New York Stock Exchange data going back to 1971.

(List Price: $499; manual alone $49)

Requires: 128K RAM, one disk drive, PC-DOS.

Sabtek Corp.
Dept. PCN
P.O. Box 1952
Cambridge, MA 02238

CIRCLE 794 ON READER SERVICE CARD

Cribbage

A game program that teaches the rules of Cribbage, scoring, and play strategies. Also included in the software is the history of the game.

Cribbage offers multiple player skill levels, and can run on either monochrome or color monitors.

(List Price: $29)

Requires: 96K RAM, one disk drive, PC-DOS.

Tailored Data, Inc.
4940 Viking Dr.
Minneapolis, MN 55435
(612) 831-3460

CIRCLE 765 ON READER SERVICE CARD



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To find out more about Multimate, the word processor, and Multimate International, the company, call Jordan Caswell at 1-800-243-3142.

Multimate

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Terminal Emulator Software

Two terminal emulator programs for using the IBM PC as remote entry stations with IBM mainframe systems. The *SDI3780* program offers the features and functions of the IBM 3780 Remote Job Entry Workstation, with the exception of Home Mode and On-Line Test Mode. The reader, printer, and punch functions are simulated via the PC's disk drives and supported printers.

The *SDI2780* program emulates every feature of the IBM 2780 Workstation with the exception of the Six-Bit Transcode, Synchronous Clock, and Off-Line operation functions.

Both terminal emulators are supplied on the same diskette.

(List Price: $599)

Requires: 64K RAM, one disk drive, PC-DOS, bisync adapter board.

Software Dynamics, Inc.
P.O. Box 247
Dunedin, FL 34296
(813) 733-8784

CIRCLE 757 ON READER SERVICE CARD



***Terminal Emulator Software**, Software Dynamics, Inc.*

Virtual Disk(ette) Access Method (VDAM)

A program allowing users to store and access data in PC format on a mainframe system. With *VDAM*, the mainframe appears as a series of diskettes or hard disks to any program running on the IBM PC. Thus, data stored on the mainframe is directly accessible to the user's system using standard DOS directory interfaces and commands.

Used with a communications port, *VDAM* acts as a transparent method for a PC to take advantage of the storage capacity of mainframe systems to store data in a form the user's system can use directly. Information stored on the mainframe's disks can be accessed by multiple PC users with authorization. *VDAM*'s virtual disks are stored on the mainframe as standard VSAM files, providing audit security trails and backup support inherent in the mainframe environment. All binary and text file types are supported.

(List Price: $500 per node; host license fee $3,000)

Requires: PC: 128K RAM, one disk drive, PC-DOS 2.0, communications port, 3270 terminal emulation software. *Mainframe:* MVS TSO operating system, 3274/3276 controller.

Phaser Systems, Inc.
353 Sacramento St.
San Francisco, CA 94111
(415) 434-3990

CIRCLE 754 ON READER SERVICE CARD

FORMIX

A language-independent programming tool, composed of a run-time executive to manage data traffic between the user and the application program, and a set of interactive screen formatting tools for designing application program screens. This CICS-like system can also be used with screen-capture utilities to download CICS data to the user's system.

For creating screens, *FORMIX* provides a "paint the screen" mode where both the positioning and edit/validation criteria of all screen elements are defined interactively. Customized on-line help screens, messages, and screen prompts can be integrated with each application being developed, along with hard-copy printouts of screen documentation. Screen attributes such as reverse video, underlining, and colors can be configured as desired prior to screen creation.

FORMIX provides language interfaces to allow designed screens to be incorporated with BASIC, Pascal, C, and COBOL applications. The run-time executive of the software handles the screen I/O, messaging, and data editing/validation for the developed application. The program itself is written in ASM86 Assembler language for Intel microprocessors. Total run-

time memory requirements are less than 12K RAM.

Support programs are provided so that application screens can be tested, modified, and accepted by the user without a line of code having been written.
(List Price: BASIC version $495; Compiler language interfaces $495)
Requires: 64K RAM, one disk drive, PC-DOS.
Master Computer Systems, Inc.
9531 W. 78th St.
Eden Prairie, MN 55344
(612) 944-5220

CIRCLE 761 ON READER SERVICE CARD

Conquest

A game program that places the player in the midst of a prehistoric setting. Represented on-screen as a falcon, the player's aim is to fly higher than the enemy pterodactyl, swoop down, and collide from above. The player may also move the bird right or left in pursuit of the enemy circling the chasm below.

Every pterodactyl destroyed drops an egg that is worth extra points to the player if intercepted. Severe atmospheric conditions, such as hurricane winds, tornadoes, and tunneling drafts, as well as fire-breathing dragons menacing the player's figure, add to the game scenario.

Conquest allows either individual or two-player games, as well as choice of keyboard or joystick control. The top ten scores are saved to disk, and there are pause and sound on/off controls.
(List Price: $39.95)
Requires: 64K RAM, one disk drive, color/graphics adapter.
Windmill Software Inc.
2209 Leominster Dr.
Burlington, Ont.
L7P 3W8 Canada
(416) 336-3353

CIRCLE 758 ON READER SERVICE CARD

PC 2622, Version 2.0

A terminal emulating program, permitting the user's system to emulate a Hewlett-Packard 2622A terminal when linked to a HP 3000 minicomputer. The software provides the user with all of the features of HP 2622A terminals and some of the features of the HP 2624 terminal, including security fields, two communications ports, and space substitution for tabs.

Like the Hewlett-Packard terminals, the *PC 2622* screen displays labels for eight function keys. However, the software itself makes multiple use of the IBM PC's ten function keys. The terminal emulator offers a choice of data transfer rates up to 19,200 baud, a printer buffer configurable up to 320K RAM, support for both parallel and serial printers, horizontal scrolling of lines as long as 10K characters, and configurable display attributes, including color on suitably equipped PCs. *PC 2622* also offers user-definable function keys, block and format modes, indicators showing cursor position and keyboard status, and menu-driven configurations for the terminal, for data communications, and for printer/device selection and operation.
(List Price: $295)
Requires: 96K RAM, one disk drive, PC-DOS, monochrome or color/graphics adapter, serial communications port.
Walker Richer & Quinn, Inc.
Lake Union Pl.
1914 N. 34th St., #201
Seattle, WA 98103
(206) 634-0503

CIRCLE 788 ON READER SERVICE CARD

Smarterm 100

A terminal emulation/file transfer program that allows the user to transfer either ASCII or binary program and data files to a host computer. The user can set up a single softkey to automatically perform a complete file transfer operation, even in "error-free" mode. A series of command sequences permit the host computer system or another PC to remotely control the PC's operation. The host system can change softkey values, initiate and control file transfer operations between the PC and the host system, and even terminate *Smarterm 100* operations.

The startup command file facility permits the user to define a series of commands that are performed automatically when the program is started. With this feature, the program can automatically select a setup configuration, auto-dial a host system, log on, transfer a file, log off, and return to DOS. File transfer functions permit a user to "capture" data being sent to the terminal into a disk file, and to transfer either ASCII or binary files to the host computer without specially programming the host computer. *Smarterm 100* can also transmit and receive ASCII and binary files over telephone lines by using a built-in protocol. This transfer mode can be used either between two PCs or between a PC and the host computer system.

The *Smarterm 100* disk includes fully functional sample BASIC and FORTRAN programs that implement the protocol.
(List Price: $149)
Requires: 128K RAM, one 320K drive, PC-DOS, Asynchronous Adapter.
Persoft Inc.
2740 Ski Lane
Madison, WI 53713
(608) 272-6000

CIRCLE 755 ON READER SERVICE CARD

FilePlan. Orga a spreadsheet organ

Here's the first electronic filing system that lets you see the big picture. On the IBM PC and most personal computers.

Like a spreadsheet, FilePlan™ puts data in rows and columns. You can scroll over your entire worksheet to see everything.



Type in any information you need to file and update—customer lists, expense records, addresses, projects due, personnel records, purchase orders.

It's easy because FilePlan works like you think. You don't have to set up a program. Just plunk in the data, *then* decide how you want to sort it, update it, retrieve it, combine it, display it on the screen and print it out. A menu of actions is always available. Help is a keystroke away.

If you'd rather see one entry at a time, just flip into "forms" mode. You can enter data either way.

The information is totally under your control.

Say you've made a file of customer orders with amounts and dates. FilePlan will automatically re-sort the list with every entry.

Then, before your next trip to Cleveland, you can:

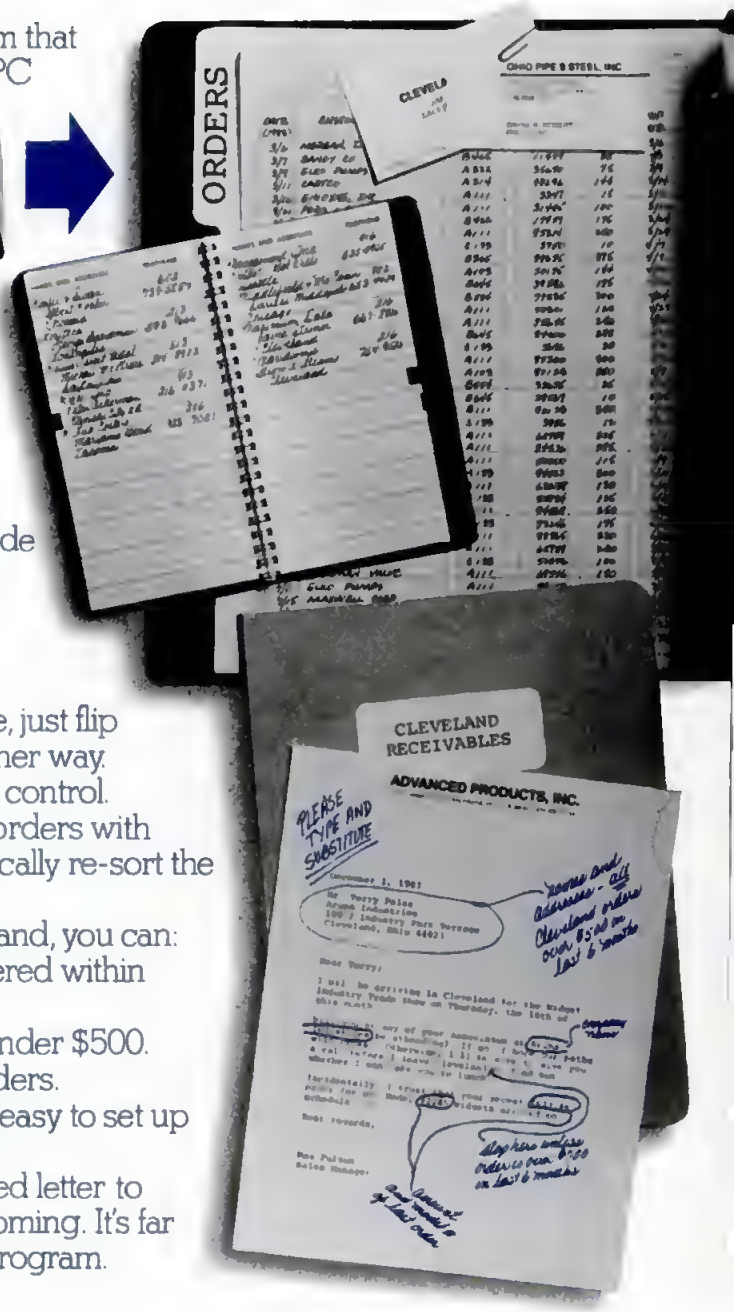
List everyone in Cleveland who ordered within the last six months.

Exclude anyone whose order was under $500.

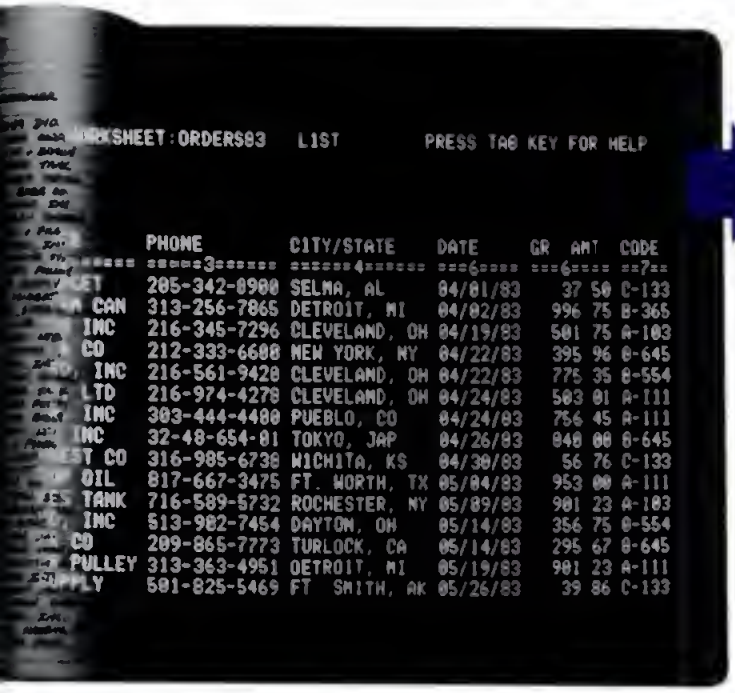
Rank the customers by their total orders.

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nizes your files like izes your numbers.







That's just a start. FilePlan eliminates most mistakes—or helps you correct them. If you forgot to include a category or need more room for a field, you can make changes any time. For someone who's inexperienced at data entry, just specify prompts and limit the kind of data allowed—for instance, nothing except five numerals under "zip code."

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CIRCLE 238 ON READER SERVICE CARD

Tax 4-5-6

A 1040 tax program for use as a template with Lotus' *1-2-3* software. The user can enter data on various IRS forms, while a fixed window on the lower portion of the screen displays the gross income, deductions, taxes, credits, and so forth.

A sample program displays various entries on over 17 tax forms and provides an empty template for your own return. The program includes a help section as well as a detailed instructional manual. In addition, the program comes with IRS publication #17, "Your Federal Income Tax."

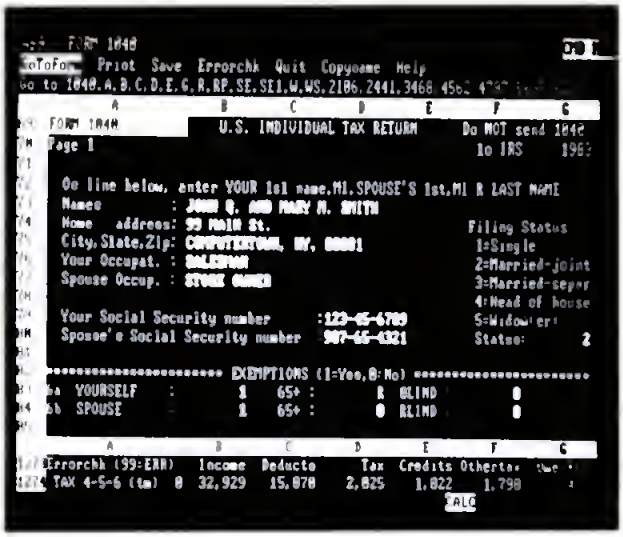
With two keystrokes, *Tax 4-5-6* prints all or specified forms. All forms, except for the 1040, have been approved for mailing to the IRS. The forms and schedules are: 1040 A, B, C, D, E, G, R, RP, two SE's, W, 2106, 2441, 3468, 4562, 4797, 5695, 6251.

(List Price: $65)

Requires: 256K RAM, PC-DOS, Lotus' *1-2-3*.

Austin Scientific, Inc.
1259 El Camino, #260
Menlo Park, CA 94025
(415) 323-6338

CIRCLE 786 ON READER SERVICE CARD



Tax 4-5-6, Austin Scientific, Inc.

PC Illustrator

A general-purpose graphics program for creating, editing, and presenting graphics images such as computer art, word charts, maps, graphs, and flow charts. Pictures created with the software can be printed on dot matrix or ink jet printers and may be saved to disk and viewed within slide shows.

PC Illustrator uses icon menus—symbolic pictures representing the selections and locations of commands. The program allows the user to create images with a variety of "brush" strokes and offers a range of line widths, rectangles and squares, bars, and circles. Other features include a curve generator, high-resolution picture editing capability, picture "cut and paste" operations, color area fill, and the ability to copy and move pictures or parts of pictures to other files. The user can control the size, spacing, text angle, and character slant of the program's high-precision text, which comes in eight different fonts.

A library of commonly used graphic symbols can be created to speed up the creation of flow charts, drafting, electronic schematics, and architectural designs. The program can accommodate digitizing pads, digital mice, joysticks, the Koala Pad, lightpens, or keyboard to make menu selections and create images.

(List Price: $119.95)

Requires: 128K RAM, two disk drives, PC-DOS, color/graphics adapter.

Computer Graphics Group, Inc.
568 14th St., NW
Atlanta, GA 30318
(404) 876-9469

CIRCLE 752 ON READER SERVICE CARD

VTERM II

A communications program emulating the DEC VT100 terminal. The software permits the user's system to hook up to any Digital Equipment Corp. mainframe, running all of the host system's software unchanged. Files can be transferred using any of four different protocols, including XMODEM and the VTRANS 7 and 8 bit protocols. The latter provide CRC-16 or checksum error detection capabilities.

Other features of *VTERM II* include:

- Sample host software for the DEC RSTS/E and VMS operating systems, written in FORTRAN and BASIC+;
- *DOS-VTERM*, which allows users to leave *VTERM II* to execute local DOS commands or other programs, then return to *VTERM II* with the original terminal screen and communications link intact;
- Full VT100 keyboard emulation, including Break, No-Scroll, Cursor Keys, and Keypad Application modes;
- 20 Soft Function Keys, allowing users to define strings of up to 66 characters in length, including special embedded commands to facilitate autodialing and log-on;
- Full VTXX-AC and VT102 printer support.

VTERM II's output can also

be routed to PC disk files.
(List Price: $160)
Requires: 96K RAM, one disk drive, PC-DOS.
Coeficient Systems Corp.
611 Broadway
New York, NY 10012
(212) 777-6707

CIRCLE 759 ON READER SERVICE CARD

ACCESSORIES

Oak 170 Series Modular Furniture

A new line of modular furniture in solid oak and oak veneers, offering flexibility in configuration for maximum user comfort. The Oak 170 Series includes a desk, hutch, printer stand, corner connector, monitor/printer platform, and an optional locking door module. The furniture features an eight-step, hand-rubbed finish, with acrylic-coated work surfaces and nonglare finish.

The desk unit, Model CT-170, has a dual-level top with adjustable keyboard and CPU shelves. The left-hand surface can be lowered to typing heights of 27, 28, or 29 inches, and keyboards can be tilted at 5-, 10-, or 15-degree angles. The desktop's fixed half features a slim drawer underneath. A full-width lower storage shelf can be fitted with one or two optional locking door modules for secure storage of hardware or software. Equipment cords fit through a slot in the rear of the desktop to eliminate cord tangles.



Oak 170 Series Furniture, Bush Industries, Inc.

Also available in the Oak Series are a hutch unit with an adjustable monitor shelf, and a matching printer stand.
(List Price: Desk Unit $279.95)
Bush Industries, Inc.
312 Fair Oak St.
Little Valley, NY 14755
(800) 228-BUSH
(800) 248-BUSH in NY

CIRCLE 770 ON READER SERVICE CARD

ProTech Security Enclosures

A line of security enclosures and locking steel cables for the separate components of a user's system.

For the IBM PC, the manufacturer produces the ProTech PC Locking Stand, a 16-gauge steel enclosure for the systems unit that secures the unit to a work surface while leaving access to the disk drives. A supplied 21-inch steel cable attaches to any type of monitor to secure it to the enclosure. The Locking Stand can be mounted either horizontally or vertically.
(List Price: $155)
Segull Enterprises
65A Wheaton Ave.
Rehoboth, MA 02769
(617) 336-4172

CIRCLE 774 ON READER SERVICE CARD

Eye Care CR-39 Lenses

A line of eyeglasses designed to minimize or eliminate many of the problems associated with prolonged viewing of a CRT display screen. The CR-39 lenses are polarized to admit light from one direction only, minimizing ambient light reflections that glare off a display screen. The eyeglasses also reduce the brightness of a screen to below the level where the human eye can discern flickering, a source of visual fatigue.

Additional benefits from the CR-39 eyeglasses include the absorption of low levels of X-rays, microwaves, and other types of ultraviolet radiation emitted by the CRT screen.

The eyeglasses are available in a range of sizes and styles, in chrome or plastic frames. Clip-on versions, for attaching to a user's own eyeglasses, are also available.
(List Price: $14-$34, depending upon style)
Pacific Trade
16 Emery Bay Dr.
Emeryville, CA 94608
(415) 655-9340

CIRCLE 773 ON READER SERVICE CARD

PUBLICATIONS

The Ratings Book

A comparison review of 30 word processing programs for the IBM PC. In addition to numerical ratings based on multiple testing, the book also contains 39 comparative rating charts, summaries of the test results for each program, and a total of 180 screen pictures showing how the menu and editing screens compare.

The book is the result of 2 months of testing by ten staff evaluators. All programs were tested for ease of start-up, learning, and use, as well as error handling, performance, versatil-

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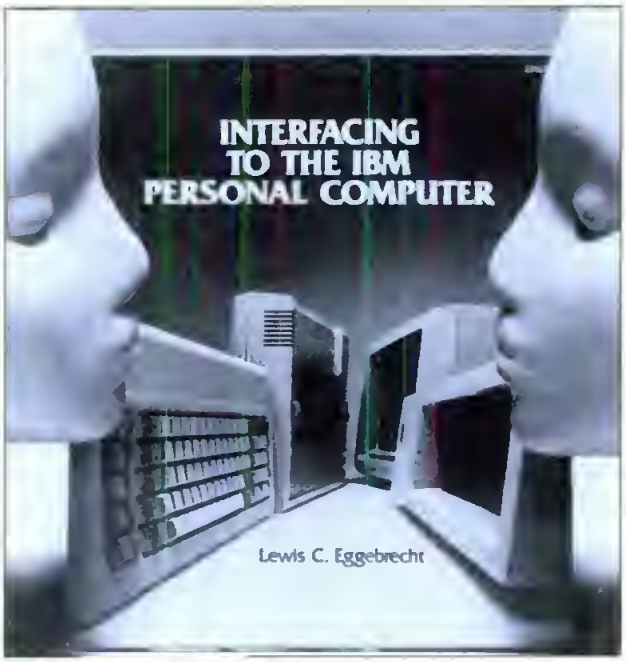
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Interfacing to the IBM PC, Howard W. Sams & Co., Inc.

ity, overall evaluation, and value for money. Each of the 30 programs was put through the same series of standardized tests ten times, by testers with varied levels of experience. Scores were then averaged for each element of evaluation to reduce the possibility of bias, and final ratings were calculated by computer.

(List Price: $14.95)
Software Digest, Inc.
1 Wynnewood Rd.
Wynnewood, PA 19096
(215) 649-7000

CIRCLE 779 ON READER SERVICE CARD

Interfacing to the IBM PC

A handbook of technical information on the IBM PC, written by Lewis C. Eggebrecht. Author Eggebrecht designed the motherboard, RAM cards, printer and communications ports, and other components of the PC for IBM. In *Interfacing to the IBM Personal Computer*, Eggebrecht covers the basic principles of the PC's BUS cycles, interrupts, Direct Memory Access (DMA) functions, and other technical aspects of the machine's operation.

Also covered are 8086/8088 Assembly language subroutines for interfacing hardware with existing software, and BASIC programs that demonstrate specific hardware functions. PC DOS and DEBUG are covered in depth, and a chapter of the book is devoted to adding new drivers to the BIOS. Five design examples detail the development of useful system hardware additions.

(List Price: $15.95)
Howard W. Sams & Co., Inc.
4300 W. 62nd St.
Indianapolis, IN 46268
(317) 298-5400

CIRCLE 660 ON READER SERVICE CARD

SERVICES

One Point Electronic Catalog

An on-line database and product distribution service, featuring descriptions and evaluations of IBM PC software. Users can purchase software from the service, which offers discount prices on many packages.

The *Catalog*'s format permits the subscriber to browse through product data by generic category, or by a program's title, manufacturer, or subject area. Many of the database's operating commands and help screens can be accessed with single keystrokes.

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(Start-up Fee: $100)
ITM
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Walnut Creek, CA 94598
(800) 334-3404
(415) 947-0850

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1. Please include the retail price, distribution methods, and details of both hardware and software requirements needed for an end-user to properly use your new product. For software especially, this includes required amount of RAM, number and type of disk drives, operating system(s) supported, and any peripheral equipment needed.

2. Releases should be typewritten double-spaced on one side of the paper. Copies of advertisements for the product may be included, but in most instances we need more information about a product than is typically included in an ad.

3. Include telephone contacts for marketing and technical questions.

4. If available, include black & white glossy photos of the product, 4 × 5 in. or larger.

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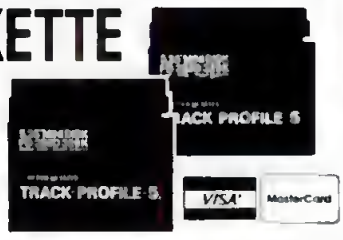
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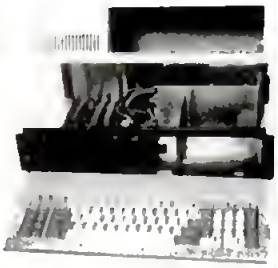
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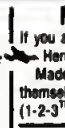
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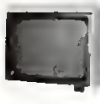
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PC User Groups

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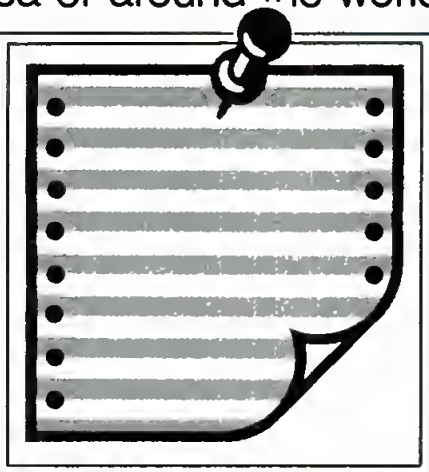
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c/o Linda de Sosa
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Stanford, CA 94305
(415) 856-6281

Kern IBM PC Users Group
P.O. Box 2780
Bakersfield, CA 93303
KERNCOM 805/833-0359
Bakersfield, CA
24 hrs, Xmodem, download and upload, messages, 300/450/1200

UCSF IBM PC User Group
c/o Mark Slichter
School of Nursing
N-319Y
U.C., San Francisco
San Francisco, CA 94143
(415) 666-2763

Pomona Valley IBM PC User Group
c/o Roy Livingston
10282 Felipe St.
Montclair, CA 91763
(714) 624-9194

Bay Area User Group
c/o Christian Du Lac
P.O. Box 155
San Francisco, CA 94101
(415) 668-4647



Silicon Valley Computer Society
c/o Elvin H. Bollet
P.O. Box 60506
Sunnyvale, CA 94088
(408) 243-1154

San Fernando IBM PC Users Group
c/o David Nussbaum
11558 Riverside Dr., #207
North Hollywood, CA 91602

Peninsular IBM PC Users Group
c/o Friendly Software Corp.
376 El Camino Real
San Carlos, CA 94070

Greater South Bay IBM PC Users Group
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Thousand Oaks Personal Computer Club (TOPCC)
c/o P. Larson
1264 El Monte Dr.
Thousand Oaks, CA 91362

Rancho California Computer Club
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Temecula, CA 92390

San Francisco IBM PC Club
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San Francisco, CA 94101

Fresno IBM-PC Users Club
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Redding Area PC Society
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The College of Boca Raton
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(continued)

PC will publish a periodic listing of PC user groups. Send new addresses or address changes to "Club News," *PC*, One Park Ave., New York, NY 10016. New groups and address changes are shown entirely in **boldface.**

Space Coast PC User Group
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1540 Monte Carlo Cou.
Merritt Island, FL 32952

Central Florida Computer Society
IBM/MS-DOS Special Interest Group
c/o Nick Konya
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Goldenrod, FL 32733
(305) 896-7100

Northern Florida Amateur Computer Club
c/o Stephen D. LeBar
10921 Kuralei Dr.
Jacksonville, FL 32216

ORANGE PC
c/o John Momberger
P.O. Box 8005
Orlando, FL 32856
(305) 855-7343

Pinellas IBM-PC Users Group
3401 Gandy Blvd., Lot #628
Pinellas Park, FL 33565
(813) 576-2608

Miami PC User Group, Inc.
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2350 N.E. 135th St., #1201
North Miami, FL 33181
(305) 940-7566

GEORGIA

Middle Georgia Computer Club
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P.O. Box 5705
Macon, GA 31208
(912) 477-7009

Microteers PC Users Group
c/o Saundra Mitchell
300 Boulevard, N.E.
Atlanta, GA 30312
(404) 653-3532

Athens IBM-PC User Group
c/o Hugh Christian
255 South Milledge Ave.
Athens, GA 30605
(404) 549-6222 (day)
(404) 543-0139 (night)
Bulletin board: (404) 546-0583

HAWAII

Hawaii IBM PC Users Group
c/o Dick Colven
P.O. Box 22967
Honolulu, HI 96822

Waikiki PC User Group
c/o Lyle Jaller
P.O. Box 15911
Honolulu, HI 96815

Maui PC Users (MPCU)
c/o Michael Skolnick
P.O. Box 1760
Kihei, Maui, HI 96753
(808) 879-8168

IBM PC User Society
c/o Arthur W. Becker, Public Affairs
Box 591
Pearl City, HI 96782

KANSAS

Topeka Library User Group
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Topeka Public Library
515 W. 10th St.
Topeka, KS 66604

IBM Users Group of Lawrence
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Lawrence, KS 66044

Wichita IBM PC Users Group
P.O. Box 18422
Wichita, KS 67218

KENTUCKY

Kentucky-Indiana Personal Computer Users' Group
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502-896-4419

Bluegrass IBM PC Users Group
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Computing Center
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University of Kentucky
Lexington, KY 40506-0045
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LOUISIANA

The Baton Rouge PC Users Group
c/o Tom Wichser
3375 King Bradford
Baton Rouge, LA 70816

MARYLAND

Baltimore IBM PC Users Group
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Jarrettsville, MD 21084
(301) 557-9965

Capital User Group, Inc.
c/o Jan Withro
P.O. Box 3189
Gaithersburg, MD 20878
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Enhancing PC-DOS

Modifying the PC-DOS "environment" turns the SET command into a powerful tool for creating custom abbreviations.

Last year when Microsoft brought forth the latest PC-DOS sibling, PC-DOS 2.0, it included some very sophisticated new features. Some of them make useful additions to a programmer's tool kit.

One programmer's tool, the SET command, has a great deal of unrealized potential. SET lets you create a list of text symbols (or variables) called the "environment," which is held in a reserved portion of memory. You can make these symbols represent longer commands or path names.

The variables and their definitions listed in the environment can be interpreted by any program that was designed with this feature in mind. The PC-DOS 2.0 documentation includes instructions that can be used to locate the environment. But so far, few applications programs have taken advantage of this feature.

Microsoft, in fact, made little use of the environment's capability in PC-DOS 2.0 itself, except when it created three symbols that control system characteristics: COMSPEC for the name of the command interpreter, PATH for the list of directories where executable files can be found, and PROMPT for the current definition of the system prompt.

To make better use of the environment, you must make some changes in the PC-DOS command interpreter—the link between a user and the operating system. Usually, COMMAND.COM is the program used as the command interpreter—so much so that COMMAND.COM's own commands (such as COPY, TYPE, and DIR) are all that most users know of PC-DOS. You send commands from batch files or the keyboard to the command interpreter, and it responds to your requests by loading and starting other programs or performing housekeeping chores such as renaming and deleting files.



Illustration: Michael Ng

Inside COMMAND.COM

This article will give you some background on how some parts of COMMAND.COM operate and a general explanation of a modification that will enable you to use the environment feature

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to make your work easier. A continuation in a future issue will provide detailed instructions on how to make this modification. It isn't difficult to do, even if you don't understand how it works.

When I designed the modification I did it in three key parts. First, I modified the COMMAND.COM file to give it some extra space, which you must also do. Then I found where input lines are analyzed by the COMMAND.COM program. Finally, I wrote new code that you can insert into COMMAND.COM that intercepts the analysis process to substitute symbol values for symbol names.

> To make better use of the environment, you must make some changes in the PC-DOS command interpreter.

This substitution of symbol values for names, which you do by using the SET command, is a powerful tool. Here's an example of what it allows you to do. Imagine that you have two file directories: one, TAXES\DATA\MARCH \EXPNS, and the other, BUDGET\REPORTS\-MARCH\TAXES. If you must refer frequently to different files within those two directories, you will end up retyping these lengthy directory names many times—a tedious and error-provoking chore.

Using the environment feature, you reduce the number of key strokes in these names by initially typing

```
SET D1=\TAXES\DATA
  \MARCH\EXPNS\
```

and

```
SET D2=\BUDGET\REPORTS
  \MARCH\TAXES\
```

Then, while you work, you can type 'D1' and 'D2' (including the single-quotation marks) as part of any PC-DOS command and get the same results as if you'd typed the directory names in full. PC-DOS will continue to interpret these abbreviations correctly until you turn off the computer or enter

```
SET D1=
```

to erase the symbol assignment. This procedure is analogous to using variables that represent values rather than the values themselves in a BASIC program. (Without this capability, BASIC would be useless as a programming language.)

This modification of the environment permits you to distinguish between characters in a PC-DOS command that are symbols and those that are to be interpreted normally. As I defined it, a symbol name must be inside single quotation marks (such as 'D1' in the example above). The single quotation mark is a good character for this purpose: it has no reserved meaning in PC-DOS, it rarely appears in file names, and it's easy to type.

Expanding COMMAND.COM

In making the modification to COMMAND.COM that permits this use of the SET command, my first step was to add space—a generous 1,024 bytes—to the body of the COMMAND.COM program itself. There's nothing expendable in COMMAND.COM that I could pull out to make room; it's packed full of modules and procedures that execute the commands you enter. After I enlarged COMMAND.COM, the procedures that initialize it had to be changed as well or nothing would work. I therefore had to analyze the code in COMMAND.COM to make sure I had accounted for everything when making changes.

The initialization process begins after COMMAND.COM is loaded into RAM by PC-DOS. In the first stage of initialization, the procedure calculates the address of the highest RAM segment (a segment is a 16-byte block) where the main body of the COMMAND.COM code (the transient part) can be set up. It calculates this segment by taking the total number of segments in the computer and subtracting the number of blocks used by the transient portion of COMMAND.COM. Once I enlarged COMMAND.COM, I also had to change the constant used in this calculation that indicates the size of COMMAND.COM.

Next, the initialization procedure tests a memory location that contains the address of the environment. The operating system will give any program it loads its own copy of the list of environment symbols that have been defined so far. A program can find its copy of the environment by using the address value contained in a specific place in its own header (or prefix).

If the computer has just been turned on or reset, no environment has yet been set up, so the value that would point to its address is set to zero. At this time, however, the initialization procedure calculates an address that points to the area that will hold the environment later. Once an environment exists, the address tells other COMMAND.COM procedures that a "secondary command processor" is invoked. (See page 10-9 in IBM's DOS 2.0 manual for more about secondary command processors.) In either case, whether an environment exists yet or not, an address is moved to a more permanent location where it can be found by COMMAND.COM's procedures, including the new analysis procedure I created.

> The input analysis procedure begins as soon as a command line reaches the COMMAND.COM program.

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Next, the main part of the COMMAND.COM program is loaded into the high area of RAM that was calculated earlier. To accomplish this, the disk file of COMMAND.COM is reopened, and the data that starts at offset 0100h within the disk file is read into the high RAM segment starting at offset 0100h. To reflect the increased size of the COMMAND.COM program, I had to modify the part of this loading procedure that indicates the total number of bytes to be read from the disk file.

Afterwards, the initialization procedure executes dozens of other instructions. Some instructions set various pointers and variables for use by COMMAND.COM in general; others are executed if COMMAND.COM has been invoked as a secondary command processor; and still others if COMMAND.COM is executed when the computer is in a power-up or reset state.

The initialization procedure ends with a jump to instructions in the high-memory, transient part of COMMAND.COM. A block of instructions is left behind as the resident portion of COMMAND.COM that handles operating system errors, the EXEC function call, and reloads the larger transient part of the program. I had to change some of the instructions in the resident block to accommodate my expanded transient portion of COMMAND.COM.

COMMAND.COM's Front End

The next instructions to be executed are COMMAND.COM's front end—the procedures that handle command input. These procedures, which reside in the transient portion of COMMAND.COM, are responsible for reading command lines either from a batch file or from the keyboard. If the line you input begins with a command like TYPE or DIR, the input handling procedures transfer control to an internal routine corresponding to that command. If you input a filename, the procedures transfer control to the operating system's file loader.

COMMAND.COM's front end is the beginning of a giant loop within the operating system. Control returns to this point not only at initialization, but every time a command is executed completely or a program exits.

The following things happen in the front-end procedure. First, the COMMAND.COM input buffer (which is used by the keyboard input procedure) is initialized as empty. The proper directory for the disk is selected. If any previous program used the piping feature, the %PIPE files are deleted. A number indicating the current disk drive is retrieved for later use. Then the echo flag is tested; if the result is true, the PC-DOS prompt is displayed.

> The front-end procedures are responsible for reading command lines either from a batch file or from the keyboard.

Next, the batch-mode flag is tested. A non-zero result in this flag points to the batch-file control block for a batch job that is currently executing. This batch-file control block contains the drive, path, filename, and parameter list for the file—information that allows the batch file to be located, opened, and read after other programs have been run. If initialization occurs at power-up, this pointer is set to a control block that specifies AUTOEXEC.BAT (if it exists) as the current batch file.

If you've entered batch mode, the batch file is opened and the pointer is set to indicate the next character in the file. The batch file is read one character at a time into the input buffer (that's why batch files run so slowly) until there's a carriage return or end-of-file marker (1Ah) in the file, which causes the batch file to close. Next, the echo flag is tested again; if the result is true, the characters that were read from the batch file are displayed on the screen. The batch-mode procedure ends with a jump to the analysis procedure, which I'll describe later.

If the batch-mode flag was zero when it was tested, which means that no active batch file was being read, another flag is tested to find whether COMMAND.COM is a secondary command processor. A true result in this test means that the command line to be processed is part of the input line that had invoked an extra copy of COMMAND.COM. This line of input is moved into the regular input buffer from wherever the initialization procedure had stored it. Afterwards, this secondary command processor branch of the front-end procedure jumps to the input analysis procedure.

If the secondary command processor flag was false, then the buffered keyboard input function is called. This function is the familiar one where the computer displays an A> prompt and waits until you enter a line from the keyboard. COMMAND.COM is now ready to analyze whatever you might type.

Input Analysis

The input analysis procedure begins as soon as a command line reaches the COMMAND.COM program, whether it comes from the keyboard or a batch file. At this point, I made the bulk of the modifications—new code that intercepts the command line, finds any symbols surrounded by single quotation marks, and replaces them with a value from the environment's table.

So that you'll understand how I ensured that the new code is compatible with the rest of the COMMAND.COM program, I'll explain how input analysis normally works.

The input analysis procedure first calls a subroutine that scans a line that you input, looking for the input/output redirection symbols (> and <) and the piping symbol (¦). If the subroutine finds one of

these characters (as in a command like DIR >OUTFILE.LST), the filename that follows is moved to a location referred to when keeping track of redirected files. If the input analysis procedure finds double quotation marks, the characters they enclose are not processed.

Next, the input analysis procedure breaks down the input line into an individual filename or command name, and any other parameters or filenames to be passed to the target program or command.

The final stage of the front-end procedure takes the first name on the input line and searches to see if it corresponds to an internal PC-DOS command name or a filename on the disk. If there's a match, COMMAND.COM calls the internal PC-DOS procedure or loads and executes the program with the given filename. If the name can't be found, a message appears saying Bad Command Or Filename.

In either case, the giant loop of the COMMAND.COM front end is completed. After this error message appears, or a program or an internal command is completely executed, the input procedure begins again.

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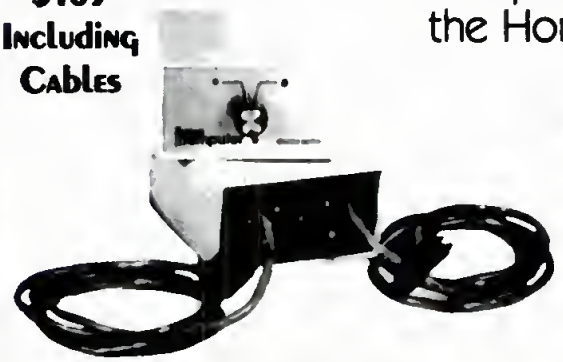
I can insert any new code I desire at the point where COMMAND.COM's front end calls a procedure that strips out the input/output redirection symbols. After my new code is executed, the flow of control returns to this point of input analysis. By making the change here, I avoid any restriction on what text or symbols can be included in the environment's symbol table or on how they can be processed. (If you ensure that the input line ends up where it should be, you can insert a new routine here without restrictions and avoid ing procedures.

In the next installment, I'll give you details on how to change COMMAND.COM to make the environment more useful. I'll identify specific memory locations and variables that are involved and list a machine language subroutine that will do the job. ■

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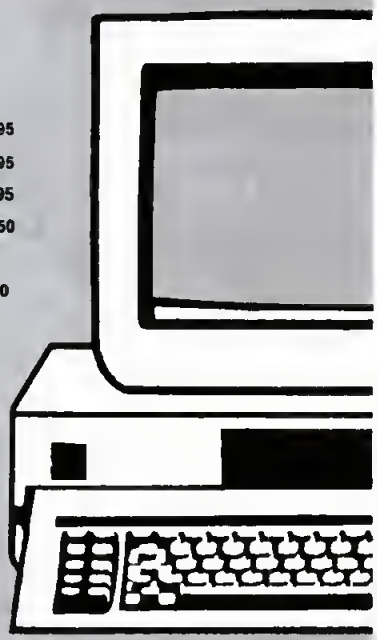
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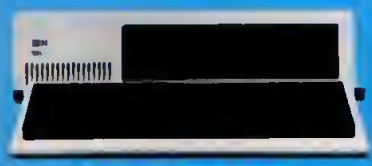
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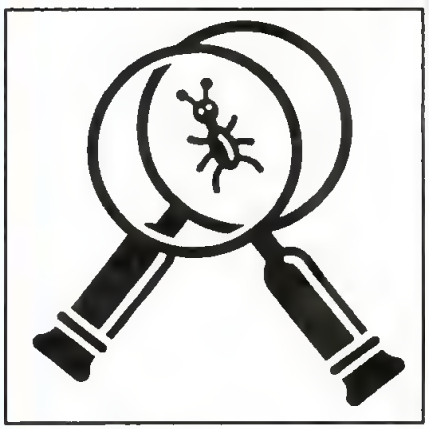
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CIRCLE 172 ON READER SERVICE CARD

User-to-User

PC readers use this forum to help one another by passing along their questions, solutions, comments, and complaints.



Out the Window

The routine in Figure 1 allows the user to selectively scroll a rectangular window anywhere on the screen. The coordinates of the upper left corner and the lower right corner of the window must be specified by integer variables. The number of lines to be scrolled must also be defined by an integer variable. If the number of lines is specified as zero, the window will be cleared in the current background color.

In Figure 1, lines 260 through 570 are the scroll routine. The demonstration program consists of lines 120 through 200. The effect of this program is to clear a selected window on the screen and print a string that is scrolled upwards by two lines. This process is repeated continuously. A small time delay loop is provided to slow down the printed strings upward movement.

The scroll routine is a machine language routine that makes use of the ROM BIOS to interact with the screen. The routine itself is embedded in the string variable P$ and may be located anywhere in memory, as there are no absolute coding references. BASIC uses the VARPTR command to determine the address at which the embedded string is located. This address is then assigned to the integer variable SCROLL%. The arguments for the CALL statement must specify the upper left window coordinates, the lower right window coordinates, and the number of lines to be scrolled in the same order as stated. If the value of the number of lines is zero, the window will be cleared. If the main program using the routine has extensive string manipulation, it is possible that the string buffer will become full. At this point BASIC frees up the "garbage" strings by relocating all current strings to sequential locations in the string buffer. This would cause the reference address pointing to P$ to be altered. For this reason all calls to the SCROLL subroutine should update the reference address to the embedded machine language routine. See Figure 2 for a machine-code version.

David A. Schultz
Calgary, Alberta

(continued)

```
100 ' WINDOW -- Scrolling program by David A. Schulz
110 '
120 COLOR 0,10:CLS:COLOR 10,0                 'set window to black background
130 GOSUB 260                                 'set up each language scroll routine
140 RX=0:GOSUB 460                            'clear window; RX is normally the
150 A$="01234567890123456789012345678901"     'number of lines to scroll
160 GOSUB 590                                 'scroll window up 2 lines
170 LOCATE 21,10:PRINT A$
180 C$=LEFT$(A$,1):A$=MID$(A$,2):A$=A$+C$     'rotate string to the left
190 GOSUB 350                                 'delay to slow down scrolling
200 IF INKEY$="" THEN 160 ELSE END            'do it again
210 '
220 '*************************************************************************
230 'the following routine can scroll or clear a rectangular window anywhere
240 '*************************************************************************
250 '
260 P$=""
270 RESTORE 560
280 '
290 '----- pack the string with the machine language routine ----------------
300 FOR I=1 TO 28
310 READ A
320 P$=P$+CHR$(A)
330 NEXT
340 '
350 '----- set the segment pointer to BASIC --------------------------------
360 DEF SEG
370 '
380 '----- determine the location of the machine language subroutine -------
390 SI=PEEK(VARPTR(P$)+1)+PEEK(VARPTR(P$)+2)*256
400 IF SI>32768! THEN SCROLLX=SI-65536! ELSE SCROLLX=SI
410 '
420 '----- specify the number of rows to scroll up -------------------------
430 RX=&R2
440 '
450 '----- specify the upper left coordinates:   row=9   column=9 ----------
460 LX=&R909
470 '
480 '----- specify the lower right coordinates:  row=20  column=39 ---------
490 RX=&R1427
500 '
510 '----- scroll up the screen --------------------------------------------
520 CALL SCROLLX(LX,RX,NX)
530 RETURN
540 '
550 '----- machine language data -------------------------------------------
560 DATA 85,139,236,139,118,6,139,4,139,118,8,139,20,139
570 DATA 118,10,139,12,183,7,180,6,205,16,93,202,6,0
580 '
590 FOR A=1 TO 100:A=A:NEXT:RETURN
```

Figure 1: *Window-scrolling routine.*

```
PUSH    BP              ;SAVE REGISTER ON STACK.
MOV     BP,SP           ;SET POINTER TO TOP OF STACK.
MOV     SI,[BP+6]       ;GET ADDRESS OF FIRST VARIABLE
                        ;SAVED ON STACK BY BASIC.
MOV     AX,[SI]         ;GET THE VALUE OF THAT VARIABLE
                        ;AND SAVE IN AX REGISTER.
MOV     SI,[BP+8]       ;GET THE ADDRESS OF THE LOWER
                        ;RIGHT CORNER OF THE WINDOW.
MOV     DX,[SI]         ;SAVE THE VALUE IN DX REGISTER.
MOV     SI,[BP+0AH]     ;GET THE ADDRESS OF THE UPPER
                        ;LEFT CORNER OF THE WINDOW.
MOV     CX,[SI]         ;SAVE THE VALUE IN CX REGISTER.
MOV     BH,07           ;SET MODE FOR THE BIOS ROUTINE.
MOV     AH,06
INT     10              ;CALL THE BIOS SCROLL ROUTINE.
POP     BP              ;RESTORE THE BP REGISTER.
RET     6               ;GET THE RETURN ADDRESS OFF THE
                        ;STACK BY IGNORING THE DATA
                        ;PLACED ON THE STACK BY BASIC.
```

Figure 2: *Machine language version of the window-scrolling routine in Figure 1.*

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USER-TO-USER

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...To the Rescue

Now that I've had my PC for a couple of years, I've collected so many useful programs that I'm beginning to lose track of them all. So I sometimes need to keep a few notes on seldom-used programs.

Most mainframe computers offer what is called a help facility. By typing the word Help, optionally followed by a program name, the user gets a quick how-to on the requested program.

Here are two methods for creating a help utility for your PC:

1. First, make a disk file of your directory by typing:

```
DIR >DIR.HLP
```

Then, using a word processor, add comments to the DIR.HLP file to the right of each entry. (See Figure 3 for a sample.)

> The scroll routine is a machine language routine that makes use of the ROM BIOS to interact with the screen.

Finally, make a batch file called HELP.BAT that says:

```
TYPE DIR.HLP | MORE
```

This method works, but it limits the amount of notes you can squeeze alongside your directory in DIR.HLP. Also, you must edit or remake DIR.HLP when your directory changes.

2. I prefer the following method

```
 Volume in drive A has no label
 Directory of  A:\

COMMAND  COM     17664   3-08-83  12:00p
PRT4D    CTL        21   9-03-82           For 40-column screen
PRT80    CTL        17   8-27-82           For 80-column screen
DOC      BAT        33D  10-17-82   4:20p  Prints PC-FILE.DOC
PC-FILE  DOC     61440   3-05-83  10:26p
PRT      CTL        39   2-11-83   4:44p  See PC-FILE.DOC for expl.
AUTOEXEC BAT        2D   1-01-80  12:01a
PC-EXPDR EXE      1792D  3-04-83   6:40p
PC-FILE  EXE     44672   3-04-83   6:10p
PC-SORT  EXE     2496D   3-05-83   9:37p  Called from PC-FILE
CLOCK-DN COM       813   9-18-82           Sets clock from battery
       11 File(s)     124928 bytes free
```

Figure 3: *Sample DIR.HLP file created by redirecting the directory into a file, then adding comments with a word processor.*

```
echo off
cle
if %1==SUBJECTS goto subjects
if %1==subjects goto subjects
if not exist %1.hlp goto nofile
copy %1.hlp con
goto endbatch
:subjects
dir *.hlp
goto endbatch
:nofile
echo Type  HELP followed by the file name (or HELP * for all).
echo Type  HELP SUBJECTS for a list of available topics.
:endbatch
```

Figure 4: *HELP.BAT batch file.*

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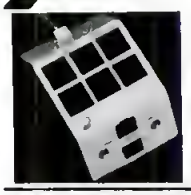
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USER-TO-USER

because it requires fewer files, less disk space, and allows for more extensive notes. First, create the batch file called HELP.BAT in Figure 4. Then, using your word processor (or simply by typing COPY CON: FILENAME.HLP), create files with the .HLP extension that explain each of your programs. With this batch file and your .HLP files, you can keep lots of information at your fingertips.

This method works especially well with a hard disk (which can contain so many more files)!

Edward Fischer
New York, New York

If you try the first version, remember to make sure the MORE.COM DOS file is on your disk. Again, a paean to the hard disk, the RAMdisk, and the batch file. This kind of documentation can be useful when you have a ton of similar sounding 11-letter filenames, some even months old.

> Switching between screens in memory is vastly underexploited.

Free Space Checker

A recently published Assembler Language program to determine the number of bytes left on a disk meets a real need but is rather elaborate. The routine described below gives another solution. (See Figure 5.)

If you have DOS 2.0 and a color adapter card and can spare 2 to 3 seconds per operation, a simple method using BASIC will do the job. Just flip to another screen "page" without changing the visual page execute FILES, and read the bottom line. Flip back and continue the program.

J. D. M. Phelps
Crystal River, Florida

This method of switching back and forth between screens in memory is vastly underexploited. The reason is probably that you can't do it on a pure monochrome system. As color becomes more popular, so will tricks like this. Even color systems don't do much with it, which is a shame. There is room for the additional pages in memory; why not use them? They are perfect for menus, help screens, etc., and they really pop—you touch a key and the screen instantly flashes to the new page. And you can perform some pretty convincing animations with them. All you color system users out there: Send your screen page tricks to us!

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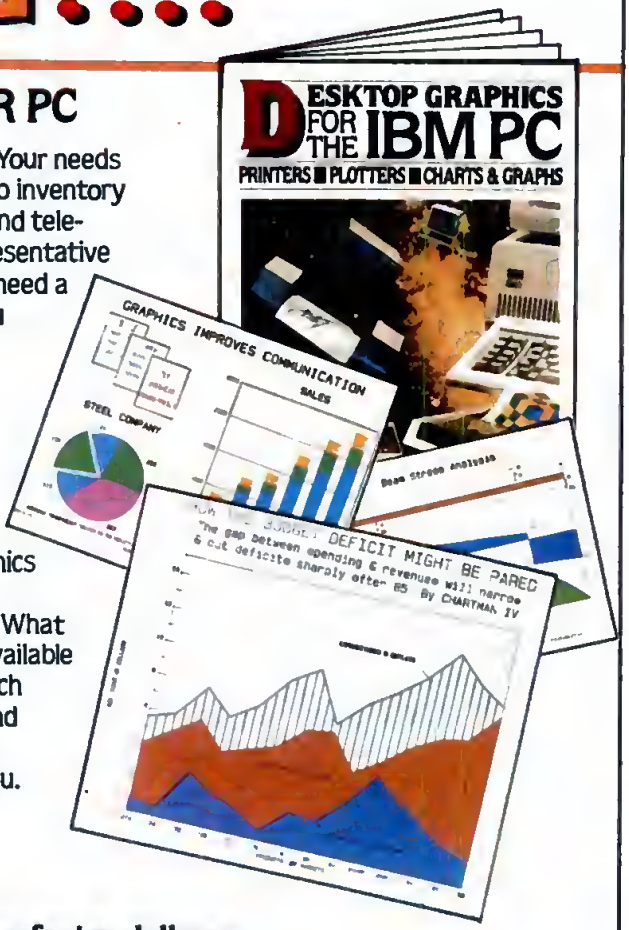
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```
100 ' FREEBYTE -- by J. D. M. Phelps -- determines bytes available
110 '
120 T1=TIMER:I=1
130 SCREEN 0,0,1,0:CLS
140 FILES
160 I=I+1:IF SCREEN(I,1)<>32 THEN 160
170 N=N+1
180 X=SCREEN(I,N)
190 IF X=32 OR (X>47 AND X<58) THEN B$=B$+CHR$(X):GOTO 170
200 SCREEN 0,0,0,0
210 LOCATE 24,1:PRINT VAL(B$)" bytes free"
220 PRINT TIMER-T1" seconds elapsed time
```

Figure 5: *Program to determine bytes available on your disk. Note that a color graphics card is required.*

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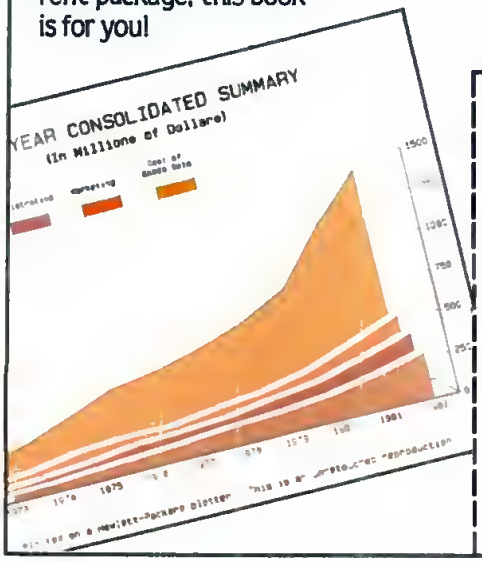


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MARK ZACHMANN

PC Tutor

Good Old Chips

Q: I received my IBM PC in March 1982. It was one of those units with the old 8088 chip, old BIOS, single-sided disk drives, and a 16K motherboard. Since then, I've upgraded my peripherals by getting a new



printer, disk drives, and expansion boards (including graphics).

Now I wonder if I should get an updated BIOS and 8088, because I've heard that some software won't run with the old chips. Is it worth replacing them? How much would it cost?

Bruce Guthrie
Washington, D.C.

A: *There is only one significant difference between early and late 8088s: the chip's ability to work in tandem with an 8087 coprocessor chip. If you don't plan to install an 8087, it would be a waste of money to buy a new 8088. Some of the early IBM PCs, like yours, have the newer 8088 chip anyway. Also, a compatible 8088 is often included when 8087s are sold.*

As far as the BIOS is concerned, the only reason to switch chips is if you plan to install a hard disk in your PC. You'd need a ROM chip with the new BIOS to be able to boot off the hard disk. If you purchase an IBM fixed disk extension, new ROMs will be supplied with it, but I don't know of any other way to obtain the new BIOS. An add-on hard disk from a source other than IBM should include either its own new ROM or device driver software suitable for an older IBM PC (the earlier model is sometimes called the PC-1).

In summary, there's no need for you to shop for new 8088 and BIOS chips. The few upgrades in which your system would need updated chips are likely to deliver their own solutions.

Shopping for a Dump

Q: In an item titled "Okidata Graphics Dumps" (*PC*, Volume 3 Number 7, page 429), you mentioned that programs exist for printing graphics screens on an Okidata printer. This interested me because I have an Okidata 92 that I plan to use on a system with a Hercules graphics card and a monochrome display.

You did not, however, identify any of these screen-dumping programs. My local dealer didn't know of any and I don't remember seeing any mentioned previously in *PC Magazine*. Can you recommend, by name, any programs that dump Hercules-generated displays to my printer?

Edmund Roberts
Delray Beach, Florida

A: *The reason I didn't recommend any such programs by name was due to a situation involving conflict of interest. I know of a program called* FRIEZE Graphics *that will do what you want, but* FRIEZE *is a product of my own software company, ZSoft Corporation. Since I write for a number of magazines in the personal computer field, you aren't likely to see published reviews of* FRIEZE *or my other ZSoft programs due to these con-*

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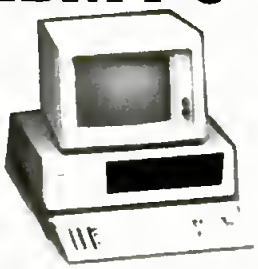
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Glitching Games

Q: Recently I added an expansion unit to my IBM PC, an old system with a 64K system board. After I ran all the diagnostic programs, I had no difficulty using my own library of programs.

My young daughter, however, couldn't get some of her game disks to boot. *BurgerTime, Apple Panic,* and *Master Type* are three that did not work.

Do you know anything about this problem? My guess is that it's due to the expansion unit's new ROM.

James H. Brown
Pleasant Valley, New York

A: *You got it! The problem must be caused by the different ROM because nothing else has changed significantly in the PC.*

Those three games probably have copy-protection schemes that are confused by the new ROM. There's a small chance that the programs are looking for a specific DIP switch setting on the system board to correspond to the information they get from the ROM, but I doubt that changing the switches alone can help. An even less likely explanation is that the presence of additional ports (used by the hard disk controller) is in conflict with the software's expectations.

You should return those programs to your dealer and ask for updated versions or a refund, because they clearly do not work on an IBM PC as advertised.

Breaking the POKE Habit

Q: I have a TRS-80 Model III with 48K RAM, two disk drives, and an Epson printer. I can POKE video addresses between 15360 and 16383 to create graphics on the screen. I also make use of other PEEKs and POKEs for keyboard input, cursor display, and other things.

For example, I can white out the screen of my TRS-80 Model III by entering this line of BASIC:

```
10 FOR X15360 TO 16383:
POKE X, 191: NEXT X
```

On an IBM PC memory map, I noticed that hex numbers, such as A4000h, are used to represent graphics and display buffers. Can you please tell me, in normal decimal numbers, the starting and ending addresses of the video memory? Is there a book that contains other PEEK and POKE addresses for the IBM PC?

Jerry Goldbaum
Flushing, New York

A: *An IBM PC, compared to the TRS-80 Model III, is a far more versatile and sophisticated machine. Thus, some things that are memory-mapped with fixed addresses on the Radio Shack machine aren't so cut and dried on the PC.*

Video memory, for example, occupies different spaces depending on whether you use IBM's monochrome or color/graphics adapter boards—and perhaps at other sets of addresses if you use a non-IBM graphics board. The IBM keyboard is not memory mapped at all, nor are the communications ports.

The customary method for communicating with the IBM PC is via BASIC commands or system calls that instruct the computer to do what you wish. By using this method, you avoid writing arbitrary PEEKs and POKEs that might work on a current PC (a.k.a. PC2), but not on a PC1 (pre-XT) or a Columbia or Compaq that might otherwise be compatible with your program.

On the IBM PC, you could white out the screen with this BASIC command:

```
10 COLOR 0,7: CLS
```

No PEEKs. No POKEs. Just straightforward code. This even gives you a simple way to set the colors used at PC-DOS

level, since the operating system will continue to display the color scheme established in BASIC until you enter the PC-DOS CLS command.

You could also white out the IBM PC's screen by writing a BASIC loop of POKEs to the video display area. To find the right memory addresses to POKE, however, your program would first have to figure out which display board was in the user's system. Once you were able to determine that the system is equipped with a monochrome display adapter, for example, you could call on this routine to set the screen to inverse video:

```
10 DEF SEG &hB000
20 REM &hB000 is mono display
   segment
30 FOR I  1 TO 4096 STEP 2
40 POKE I, 112
50 NEXT I
```

Hexadecimal (base 16) notation is used here for the segment address (&hB000) because the IBM PC's microprocessor, the 8088, insists on binary (base 2) organization, and hexadecimal numbers correspond to that structure better than decimal numbers do. I could have written a decimal number in the above program (DEF SEG 45056), but I find that a hexadecimal number like &hB000, which rounds off nicely with three zeros, is easier to remember than 45056.

In line 40 the decimal value 112 is equivalent to the hexadecimal value 70, which would be a more meaningful number to read. The first byte (7 here) indicates the background attribute and the second byte (0) identifies the foreground color.

Keep in mind that for a system with an IBM Color/Graphics Adaptor instead of a monochrome board, line 10 would need the hexadecimal value &hB800 instead of &hB000.

If you desire to interact more closely with your PC hardware than standard BASIC commands permit, you should learn the various system interrupt calls. In IBM's Technical Reference *manual you can find a fully commented source code listing of the PC's BIOS that documents all the memory addresses and interrupt calls in excruciating detail. If you plan to get that deeply into programming an IBM PC, expect to learn base 16 as you go.*

Hong Kong Currents

Q: I'd like to take my IBM PC along when I go on an assignment in Hong Kong. How can I handle the difference in electrical supplies? Where can I get any necessary equipment?

Keith K. Wann
San Diego, California

A: *Judging from the reports I've received from PC users, the computer will work just fine when it's fed foreign electricity if you connect the PC to a suitable transformer. In Hong Kong, the power is 220 volts and 50 Hz. Get a transformer to convert this. Make sure the transformer can handle all the power that the PC needs: The* Technical Reference *manual says it draws 63.5 watts, but monitors, additional disk drives, and boards will increase its power requirements.*

You may also need plug adapters because some foreign electrical outlets have different sockets. Make sure that whatever outlet you use has a properly grounded three-wire connection so you don't get shocked.

Any electrical supply house should be able to provide whatever plug adapters and step-down transformers you need. A local travel agent might also suggest some sources.

IBM's new Portable PC, by the way, has a 130-watt power supply with a switch that permits operation at either 120 or 220 volts. It also runs fine with either 50 or 60 Hz power.

The PC Tutor solves practical problems and explains points of general interest. If you'd like to see your questions answered here, drop a line to PC Tutor, *PC Magazine*, One Park Avenue, New York, NY 10016. ■



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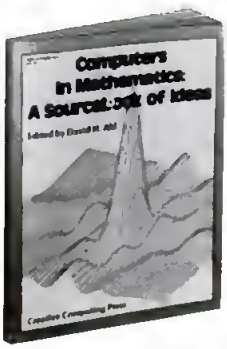
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Illustration: Michael Ng

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What's Available?

At this writing, The Knowledge Index offers nearly 25 files, each of which contains a certain category of information. The Books-in-Print file, for example, will give you a list of all books on a particular topic or by a particular author. And Newsearch lets you locate stories in over 370 popular American magazines, plus the *Wall Street Journal*, the *New York Times*, and the *Christian Science Monitor*. These newspapers are indexed daily and ready for searching 24 hours after publication.

Of special interest to anyone with an attic full of computer magazines are the four files that focus on computers and computing. INSPEC handles the heavy stuff—physics, electronics, circuit and chip design, and the like. The International Software Database profiles over 52,000 mini and micro programs. The Microcomputer Index focuses on over 40 English-language computer magazines. And The Computer Database, offered by Management Contents, Inc., includes citations from more than 500 journals, proceedings, transactions, books, newsletters, and

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You can obtain photocopies of any article referenced by any KI database. The cost is $6.25 per order ($8.25 outside of North America), plus 20 cents a page. Orders can be placed on-line and normally require from 1 to 2 weeks to fill, but "rush" service is available for an additional fee of $6.00 per item.

The best way to get a handle on the kind of information a KI file provides is to look at Figure 1. I needed a graphics package capable of producing a slide show for a presentation I had to do, so I signed on and entered The Computer Database. By design, KI offers a much simpler search language than Dialog, and the manual does an excellent job of showing you how to use it. At the system's question mark prompt I simply entered: Find IBM And Graphics And Slide? to start the search.

This told the system to retrieve only abstracts containing all three of these terms. I used the question mark "wildcard" character after Slide to be sure of finding "slides," "slideshow," and any other permutation. The response was quite fast. The system listed the number of articles containing each term and the number containing *all* of the terms I had specified. I began the second phase of information retrieval: taking a look at what the system has found for you. On KI, if you merely enter the word "Display," the system will present the most recent citation in the file. I asked to have the fifth citation in Set 1 listed in the Long mode. This produces the complete citation, part of which is shown in Figure 1.

```
?BEGIN COMP4 <---------------Go

MM/DD/YY HH:MM:Now in Computers & Electronics (COMP)
            Section
  The Computer Database (COMP4)
  Corp. Managems 1984

?FIND IBM and GRAPHICS and SLIDE? <----Tell system what to look
                                       for.  Note a question mark is
                                       used as a "wildcard."

              4985 IBM
              3698 GRAPHICS
               111 SLIDE?
         S1    11  IBM AND GRAPHICS AND SLIDE?<---11 reference
                                       or "hits," labelled S1 ("set
                                       1") for convenience

?display S1/LONG/5 <----Display citation 5 in Set 1 using the
                        LONG form.
           Display 13/L/5 <---System tells you what it's doing.
                           The target citation follows.


111376   PC183F0215
   Software: The PC Draws with Templates and Palettes.
   Darfler, F. J.
   PC  (Independent Guide to IBM Personal Computers) No. 1, June
   1983, P. 215,217,218+. 7 Pages.
   Country of Publication: U.S.A.   Language: English
   CODEN: PIGCDO   ISSN: 0743-2500
   Availability:  Available from Management Contents through
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   Document Type: Journal   Article Type: Software Review
   Special Features: includes Drawings; Diagrams
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are Qlphix and Frieze by Starside Engineering, PC Crayon, and
PC-Draw by Microgrefx. Qlphix is a package that will allow
shapes to be drawn free form or by entering parameters into
functions to build specific shapes such as a circle. Frieze is a
program that stores the shape. They list for $24.95 and $55.00
respectively and require 64K, BASICA, and a color/graphics
adapter and color or non-IBM monitor. PC-Crayon has the same
capabilities as Qlphix and Frieze, with the added feature of
                                       For more, enter PAGE
```

Figure 1: *Searching The Computer Database for articles on IBM PC graphics and slides.*

Conclusion

I found the response time on The Knowledge Index to be excellent, and the commands are easy to understand and use. And $24 an hour is not an unreasonable price to pay for this service. In fact, it's a bargain. The search shown in Figure 1 cost less than $1, whereas searching The Computer Database on Dialog during the regular business day would cost $85 an hour, and you would be charged for each citation "displayed."

Two caveats apply, however. The first is the currency of the information in the various files. Supplying updates is the responsibility of each database vendor, and their policies vary. The Computer Database is updated every 2 weeks.

The second caution is to make sure that you read the manual. Lots of examples and sample searches are provided, and you might want to use some of your initial two hours to work through some of these. Once you take the time to get into the swing of online searching, you'll discover that The Knowledge Index can be an incredibly powerful resource, and you'll never have to go rummaging through your prized magazine collections again. ■

Alfred Glossbrenner is the author of The Complete Handbook of Personal Computer Communications *and* How to Buy Software, *both from St. Martin's Press. He can be reached at TCS772 on The Source and at 70065,745 on CompuServe.*

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Modems Demystified

An excerpt on how modems work from the book *Digital Communications Programming on the IBM PC* by David Schwaderer detailing the technical process by which modems translate, send, and receive information.

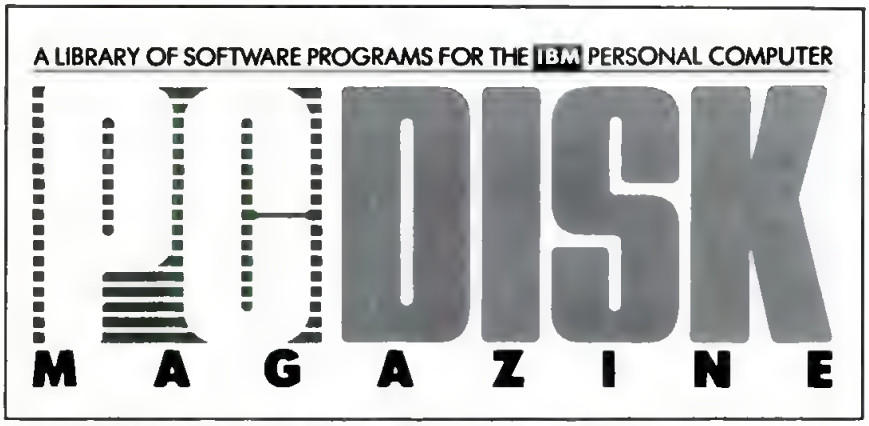
Product Review

The word *crosstalk* has bad connotations for people in the communications industry, but our reviewer found that *Crosstalk XVI*, a full-featured communications program for the IBM PC, changes the meaning of the word.

Mathematical Modeling With TUTSIM

This simulation tool for creating mathematical models of circuits, machinery, and systems was originally designed to run on the PDP 11, but it has been redesigned to run on the IBM PC. A complete technical review.

COMING UP



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Wine Data 3

Oenophilists rejoice! Now you can refer to a convenient data file to learn about various quality wines. Our previous two issues detailed the wines of France and Italy, and we now offer our final installment that covers the wines of our own sunny California. From Chardonnay to Zinfandel, the United States' most popular wines are evaluated according to grape variety. Find out about the origins and distinctive characteristics of these grapes, the wineries that produce them, and the vintages that are worthy of notice. Gather enough information to stock your cellar and intimidate wine stewards.

CURVE FITTER

For those of us who must work with mountains of data yet are not mathematically inclined, this program is a lifesaver. *CURVE FITTER* helps you assemble and plot a set of data and then determines the relationship among these points. Using the least-squares fit regression method, the program chooses the type of curve that best fits your data, then plots it against the data points. The resulting curve—linear, exponential, second order, logarithmic, or power—helps you make projections. You'll never need to plot with paper, pencil, and eraser again!

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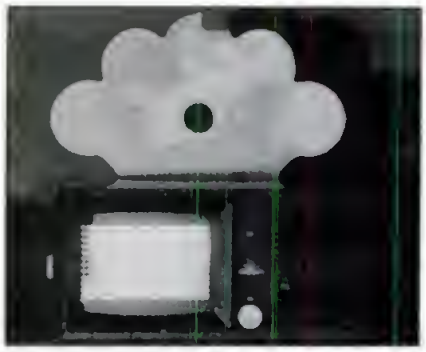
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Coming Up



Kaypro 4 Plus 88

Kaypro Corporation, makers of one of the more popular CP/M machines, has come up with a new model, the Kaypro 4 Plus 88, that runs both CP/M and DOS. Can one machine use both operating systems well? Does the Kaypro switch-hitter have anything else special to recommend it? *PC Magazine* will explore these questions from the perspective that counts most—yours.

Framework vs. Symphony

Watch from ringside as *Framework*, the latest windowing and integrated software package from Ashton-Tate, and *Symphony*, the newest offering from Lotus, battle for the World Championship of business software here in the pages of *PC*. We'll review the products, characterize them, and look at what they do—and what they don't do. Then our "panel of experts" will choose the winner of the heavyweight software title.

Project: Database, Part 5

PC looks at Category 3 (*dBASE II*-type) databases as we continue our review series of DBMS packages. As in the second category of databases, Category 3 packages can handle more than one file at a time and often feature a query language. But they are even more sophisticated since they can be programmed.

Professional and Business BASIC

PC will explore what makes these two versions of one of the oldest programming languages different from all other languages. What effect will Professional and Business BASIC have on program development and testing? What impact will Professional BASIC have on first time users?

Great Plains Software

The Price Waterhouse Report takes a look at another accounting package, this one an inventory management system for retailers, from Great Plains Software. In the past, few software developers have oriented their packages to the special needs of retailers who must update inventory figures at the point of sale. Does Great Plains Software have the answer to retailers' prayers?

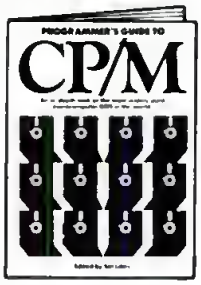
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Edited by Sol Libes

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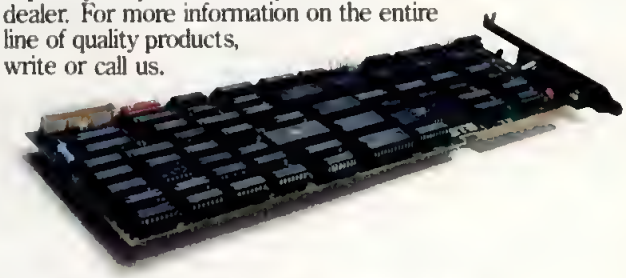
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